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Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

VOL. 96. NO. 1

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A STUDY OF THE SNAKE, *TACHYMENIS PERUVIANA* WIEGMANN AND ITS ALLIES

BY WARREN F. WALKER, JR.

WITH FIVE PLATES

CAMBRIDGE, MASS., U. S. A.

PRINTED FOR THE MUSEUM

NOVEMBER, 1945

PUBLICATIONS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

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Of the BULLETIN, Vols. 1 to 95, and Vol. 96, No. 1, have appeared and of the MEMOIRS, Vols. 1 to 55.

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Bulletin of the Museum of Comparative Zoölogy
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No. 1. — *A Study of the Snake, Tachymenis peruviana Wiegmann and Its Allies*

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INTRODUCTION

Historical

Tachymenis was established by Wiegmann in 1835 on the basis of a specimen from Peru. The type was named *peruviana*. Although Wiegmann's characterization was adequate, many species from all parts of the world were subsequently referred to the genus, which naturally caused it to have very little real meaning. By the time of Boulenger's *Catalogue* (1893–1896) Boettger, Boulenger, and Cope had simplified the situation by placing the Old World forms in either *Tarbophis* or *Amplorhinus*, and most of the New World ones in *Erythrolamprus*, as follows:

Tachymenis dromiciformis Peters 1863	= *Erythrolamprus dromiciformis* (Peters) 1863.
Tachymenis vivax Günther 1864	= *Tarbophis savignyi* (Savigny) 1829.
Tachymenis fissidens Peters 1869	= *Erythrolamprus imperialis* (Baird and Girard) 1859.
Tachymenis melanocephala Peters 1869	= *Erythrolamprus lateritius* (Cope) 1861.
Tachymenis taeniata Peters 1869	= *Erythrolamprus piceivittis* (Cope) 1869.
Tachymenis piceivittis Günther 1872	= *Erythrolamprus piceivittis* (Cope) 1869.
Tachymenis nototaenia Peters 1882	= *Amplorhinus nototaenia* (Günther) 1864.
Tachymenis bipunctata Garman 1883	= *Erythrolamprus bipunctata* (Günther) 1858.
Tachymenis fissidens Garman 1883	= *Erythrolamprus fissidens* (Günther) 1858.
Tachymenis imperialis Garman 1883	= *Erythrolamprus imperialis* (Baird and Girard) 1859.
Tachymenis lateritia Garman 1895	= *Erythrolamprus lateritius* (Cope) 1863.
Tachymenis dicipiens Günther 1895	= *Erythrolamprus dicipiens* (Günther) 1895.
Tachymenis grammophrys Günther 1895	= *Erythrolamprus grammophrys* (Dugès) 1888.

Boulenger completed the job in his *Catalogue*, and redefined *Tachymenis* to include only *peruviana*, which he believed to range from central Peru through Bolivia to southern Chile, and *affinis* of central Peru. The latter was a new species which he described. He included *Coronella*

chilensis Schlegel 1837 and *Psammophylax assimilis* Jan 1863 in the synonymy of *peruviana*. All of this was a significant contribution toward an understanding of the genus.

However, in following years large numbers of *peruviana* (as redefined by Boulenger) were accumulated by the museums of the world. These were taken at elevations ranging from sea level to the high Andean plateaus of 13,000 feet, and from localities extending from central Peru to southern Chile — a range in latitude equivalent to the distance from New York to Panama! Naturally considerable geographic variation was encountered, and similarly a great deal of variation found in the specimens. Investigators began to feel that several races or even species were involved. Werner (1898, 1901, 1904) recognized five varieties of *peruviana: p. peruviana* in Peru, *p. vittata* in central Chile, *p. coronellina* in north central Chile, *p. catenata* in north

An indication of the climatic variation can easily be obtained from an examination of rainfal and temperature figures. Data from Carlson (1943) for a few selected stations follow:

Station	*Annual Rainfall (Inches)*	*Period of Heaviest Rain*	*Annual Average Temp. (F)*	*Temperature Range*
Cuzco, Peru	31.7	January	51.3	6.9
Arequipa, Peru	4.2	February	56.8	2.3
Antofagasta, Chile	0.2	.....	63.0	12.4
Coquimbo, Chile	4.5	June	58.3	10.4
Santiago, Chile	13.8	June	57.0	23.0
Valdivia, Chile	105.5	June	52.9	16.4
Puerto Montt, Chile	86.1	July	51.8	13.6

N.B. No specimens have been taken at Antofagasta. The record is merely included to indicate the aridity of northern Chile. Specimens have been taken at all other stations.

central and central Chile, and *p. dorsalis* in Bolivia. These varieties were poorly defined and, since they only made matters confusing, they have not been generally recognized. Amaral (1930) followed Boulenger in recognizing only *peruviana* and *affinis* in the area from central Peru through Bolivia to southern Chile. Hellmich (1938), working primarily with Chilean material, made another attempt to break up the apparent vast array of forms included in *peruviana*, but came to the conclusion that only one widespread and very polymorphic species was involved.

The primary purpose of this work has been to review the situation and make a more careful study of the variations of *peruviana* (as redefined by Boulenger) throughout its entire range, in order to determine whether or not more than one species is involved, or, if only one, whether or not there is any clinal sequence in the variation. In clarifying the status of *peruviana*, the generic type, I have also considered its

relation to *affinis* of Peru and to the three outlying species which have been added to the genus since Boulenger's *Catalogue: brasiliensis* Gomes (1918) from Sao Paulo, Brazil; *elongata* Despax (1910) from northern Peru; and *surinamensis* Dunn (1922) from Surinam (Dutch Guiana). Thus, in a sense, this paper constitutes a generic revision, but, since no specimens of *elongata* and *brasiliensis* are available and the descriptions are inadequate, my conclusions regarding the outlying forms are tentative, and this study centers around *peruviana* and its immediate allies.

Geographic Conditions

In order to understand the morphological variation found in *peruviana* (*sensu* Boulenger) some knowledge of the geographic conditions encountered by this snake in its wide range is necessary. The bulk of the Peruvian and Bolivian specimens have come from the Andean region from central Peru into Bolivia. Apparently they are primarily highland snakes for they occur at least as high as 13,000 feet, and few have been taken at low elevations. The lowest record on the west side of the Andes is 1,630 meters (about 5,350 feet); on the east side a few have worked their way farther down from the mountains and have reached at least the edge of the tropical lowlands. Specimens have been taken in the predominantly lowland department of Madre de Dios in Peru and also from the city of Santa Cruz (elevation about 500 meters, 1,640 feet) in Bolivia. Consequently many of these snakes have encountered alpine conditions with a vegetation characterized by procumbent dwarf shrubs and low cushion or rosette-shaped plants; others, the more favorable and moist conditions found on descending the eastern side of the mountains, where areas of grass steppes and scattered shrubs, savanna and evergreen woods, and tropical rain forest are encountered more or less in succession. Those from the western slopes of the Andes in this region have found little precipitation due to prevailing south-easterly winds. Thus the climate at the higher elevations is semiarid with a xerophytic vegetation of cacti, low shrubs, and heath. Lower down, there is a belt of desert crossed by fertile river valleys. This is complicated along the narrow coastal plain by a rich lomas vegetation dependant upon heavy fogs, but *Tachymenis* does not extend this low in Peru.

The Chilean specimens have been taken at lower elevations along the coast and western slopes of the Andes in the central part of the country from the province of Atacama to Chiloe. They are apparently

absent from the extreme deserts of northern Chile where nitrate deposits, salt basins, and intermittent rivers are the characteristic features. Neither are they found in the cold damp forests of the far south. Thus these snakes have avoided the extremes, but even in central Chile they have encountered a wide range of topographic and climatic conditions. The Andes tend to become progressively lower on going south. At first the mountains ascend more or less directly from a narrow coastal plain, but to the south, a low coastal range of 1,000 feet to 1,500 feet elevation and a broad central valley are interposed between the Pacific Ocean and the Andes proper. In going south in this region there is also an accompanying climatic change fully as pronounced as that in topography. The temperature gradually decreases, and the prevailing winds, which are off shore in the north, shift to come in from the ocean. This causes a pronounced precipitation gradient. The northern deserts give way to semiarid conditions in Atacama, and these to a mild mediterranean climate from the southern part of the province of Coquimbo to Bio Bio. South of the Rio Bio Bio forests appear and the climate is marine, a condition which becomes very pronounced in the far south.

Composition of *peruviana*

Given the diversification of geographic conditions outlined above, it is not surprising that *peruviana*, as hitherto considered, shows a great deal of variation in coloration, squamation, dentition, and even in penial characters. With the combined material of the American Museum of Natural History, the Chicago Museum of Natural History, the Museum of Comparative Zoölogy, and the United States National Museum, enough specimens from all parts of the range were brought together to be able to analyze the variation quite accurately. It was soon obvious that *peruviana* was merely an *omnium gatherum*. With such a large amount of material (209 specimens from 59 localities), it has been relatively easy to separate the forms involved. Unfortunately, however, some crucial regions where intergration might be expected are poorly represented. Consequently, in breaking up the array of forms previously included in *peruviana*, the question of which are races and which species has been largely a matter of personal judgment based on the degree of difference. I have no illusions as to the permanency of my findings. Further revision will doubtless be necessary as more material becomes available.

As I see the situation, *peruviana* can be broken down into three species complexes. One found in the Andean regions of central and southern Peru and Bolivia, a second along the edge of the tropical lowlands of Peru and Bolivia, and a third along the coast of Chile. These I have called the *peruviana*, *attenuata*, and *chilensis* complexes respectively. Names were available in the synonymy of *peruviana* for many of the forms in these groups.

The *peruviana* complex includes *peruviana* of Wiegmann and *tarmensis* to be described. I have also placed *affinis* of Boulenger in this group. These species are characterized by a fairly stocky body form. The body of the hemipenis is covered with spines of subequal length, its base only has a few minute ones, and its tip is covered by small spines which fuse at their bases to give a slightly calyculate appearance. There are 5–12 solid maxillary teeth. Normally they have 1 pre- and 2 postoculars, and 8 supralabials with the fourth and fifth entering the orbit.

The *attenuata* complex contains a new species with two races: *attenuata attenuata* and *attenuata boliviana*. The body form of these is quite elongate in comparison with members of the other complexes. This is reflected in a greater number of caudals (60–69 as opposed to 37–55 in the other two groups), total ventrals (210–221 as opposed to 176–217), and ratio of tail length to total length (0.22–0.24 as opposed to 0.14–0.21). The spines on the body of the hemiphenis increase in size posteriorly, the base has several very large spines as well as scattered minute ones, and the tip is distinctly calyculate with only slight traces of spines. The solid maxillary teeth are more numerous than in either other complex ranging from 12–16. The oculars are variable, but the supralabials are still normally 8(4–5).

The *chilensis* complex contains three races arranged in north-south sequence along the coast of Chile: *chilensis assimilis* (Jan), *chilensis chilensis* (Schlegel), and *chilensis melanura* to be described. In all, the body proportions, and consequently the ventral scales and ratio of tail length to total length, are close to those of *peruviana*, but the penis resembles that of *attenuata*. The solid maxillary teeth range from 6–8. There are typically 2 pre- and 2 postoculars, and the supralabials are normally 7(3–4).

In summary *peruviana* as hitherto considered breaks up as follows: The *peruviana* complex:

peruviana Wiegmann
tarmensis spec. nov.

The *attenuata* complex:
attenuata attenuata spec. nov.
attenuata boliviana subsp. nov.
The *chilensis* complex:
chilensis chilensis (Schlegel)
chilensis assimilis (Jan)
chilensis melanura subsp. nov.
Boulenger's *affinis* appears to belong to the *peruviana* complex.

These three complexes will be described in detail. This will be followed by a discussion of their relationships to one another and to the outlying forms of *Tachymenis*, my concept of the genus, and the habits of the various forms.

Localities

In as much as South American collecting sites are frequently rather unfamiliar towns, I shall give a brief description of the localities from which specimens have been examined before proceeding. In this list, I have followed the spelling on the American Geographical Society's *Map of Hispanic America* where possible in an attempt to standardize the spelling of localities.[1] Unless specific and accurate elevations were available, those of the American Geographical Society's maps have similarly been followed. The writings of Bingham (1916), Bowman (1916), Stiglich (1922–23), and Weberbauer (1936) have been extremely useful in obtaining information about Peruvian localities, and Carlson (1943) and Rudolf (1929) for Bolivian and Chilean places. The location of the department or province of any given locality can be determined by consulting the accompanying map of the distribution of the various forms (Pl. 1).

Peruvian Localities:

Arequipa: The capital city of the coastal department of Arequipa. Its elevation is about 7,500 feet. The region is semiarid except in irrigated valley bottoms.

Chospiyoc: A town in the lower part of the Cuzco valley south of Ollantaytambo, department of Cuzco. Its elevation is 10,000 feet. The vegetation consists primarily of grassy steppes.

Chucuito: A town on the shore of Lake Titicaca just south of the city of Puno, department of Puno. It is in a region of grass steppes. The elevation is 3,820 meters.

[1] In accordance with present American trends, and in the interest of simplicity, I have dropped all the Spanish accents from the place names.

Collacachi: A town in the department of Puno, about five miles southwest of Chucuito.

Cuajones: A mining camp located at an elevation of 3,230 meters in the upper tributaries of the Rio Moquegua, department of Moquegua. The region is semiarid.

Cuzco: The capital city of the department of Cuzco. The city is located at an elevation of 3,495 meters in a broad fertile valley surrounded by grassy highlands.

Huacullani: A small town in the southern part of the department of Puno a bit northeast of Pisacoma. It is located at an elevation of about 4,000 meters at the edge of the Titicaca basin very near the Bolivian border. The vegetation is alpine.

Huanta: A large city in the northern part of the department of Ayacucho. It is located at an elevation of 2,730 meters on a small tributary of the lower Montaro in a region with a vegetation that is transitional between the highland grass steppes and evergreen woods.

Huarocondo: A town in the central part of the Cuzco valley between Chospiyoc and Cuzco, department of Cuzco. Its elevation is 11,000 feet. The vegetation consists primarily of grassy steppes.

Huispang: A town in the department of Cuzco. It is probably in the Urubamba valley northwest of the city of Cuzco. Its elevation is 12,175 feet.

Juliaca: A city in the department of Puno near the northwest end of Lake Titicaca. Its elevation is 3,825 meters. The vegetation consists primarily of grassy steppes.

Macchu Picchu: Famous Inca ruins located above the deep Torontoy gorge of the Rio Urubamba, department of Cuzco. Elevations change rapidly in the region, but specimens from here are said to have been taken at timberline at 12,000 feet elevation. The vegetation is transitional between that of the highlands and that of the tropical lowlands.

Madre de Dios: A department of southeastern Peru. Most of it belongs to the tropical lowlands but there are a few foothills of the Andes in the southwestern part which reach a height of 2,500 meters. It is not known from what part of the department the specimens came.

Ollantaytambo: A town in the Urubamba valley above the ruins of Macchu Picchu, department of Cuzco. Its elevation is 9,400 feet. The vegetation consists of grassy steppes.

Pachacayo: A town in the Montaro valley between Oroya and Jauja at an elevation of about 3,500 meters, department of Junin. The vegetation consists of grassy steppes.

Pisacoma: A small town located at an elevation of about 4,000 meters in the southern part of the department of Puno. It is very near Huacullani. The vegetation is alpine.

Pucara: Inca ruins in the department of Puno located near the Cuzco railroad at an elevation of 3,880 meters. The vegetation is alpine.

Puno: Capital city of the department of Puno located on the northwestern shore of Lake Titicaca at an elevation of 3,820 meters. The vegetation consists of grassy steppes.

Puquiura: A town in the Cuzco valley located at an elevation of 9,500 feet between Cuzco and Huarocondo, department of Cuzco. The vegetation consists of grassy steppes.

San Anton: A town in the department of Puno located in the northern part of the Lake Titicaca basin at an elevation of 3,990 meters. The vegetation is alpine.

Sicuani: A town in the department of Cuzco along the railroad to the capital. The elevation is 3,515 meters; the vegetation alpine.

Tarma: A town in the department of Junin encountered on the way to the Chanchamayo region. It is located near timber line at an elevation of about 3,000 meters.

Toquepala: A mining camp located at an elevation of about 9,000 feet in the upper tributaries of the Rio Locumba, department of Tacna. The climate is semiarid.

Urco: A hacienda in the upper part of the Urubamba valley above the town of Urubamba, department of Cuzco. The elevation is about 3,000 meters. The vegetation consists primarily of grassy steppes.

Vitor: A town in the Vitor valley below Arequipa, department of Arequipa. Its elevation is 1,630 meters; the climate semiarid.

Yanama: A town in the Montaro valley just above Jauja, department of Junin. The elevation is about 3,500 meters. The vegetation consists of grassy steppes.

Yauyos: A town in the upper tributaries of the Rio de Canete at an elevation of 2,930 meters, department of Lima. The climate is semiarid.

Yunguyo: A town in the department of Puno located along the southern shore of Lake Titicaca at an elevation of 3,820 meters. The vegetation consists of grassy steppes.

Yura: A town in the department of Arequipa. It is located a bit to the northwest of the city of Arequipa at an elevation of 2,575 meters. The climate is semiarid.

Bolivian Localities:

Incachaca: A town somewhere in the department of Cochabamba. Most of the department is below 3,000 meters, and has a vegetation transitional between that of the highlands and that of the lowlands.

Santa Cruz de la Sierra: Capital city of the department of Santa Cruz. The city is located at an elevation of about 500 meters near the edge of the tropical lowlands.

Chilean Localities:

Angol: A city on the east side of the coastal range in the province of Bio Bio. The mountains in the vicinity are under 1,000 meters. The climate is slightly marine.

Cerros de Aculio: A local range of mountains somewhere in the southern part of the province of Santiago. Their elevation is probably under 2,000 meters. The climate is mediterranean.

Chanarcillo: A town about 40 miles from the coast in an intermittent river valley of the semiarid province of Atacama. Its elevation is between 500 and 1000 meters.

Chile: A few specimens have no data other than the country. One, with no data at all, is undoubtedly from Chile.

Chiquaihue: A town near Collipulli in the southern part of the province of Bio Bio. Its exact location is not known, but Collipulli is located at an elevation of 200 to 500 meters on the main Andean range just west of the central valley. The climate is slightly marine.

Concepcion: It has been assumed that specimens with this data have come from the vicinity of the coastal city of Concepcion — capital of the province of Concepcion. The climate is transitional between mediterranean and marine.

Coracol: A small town on the coastal range in the province of Concepcion. The mountains are under 1,000 meters in elevation; the climate transitional between mediterranean and marine.

Curacautin: A town on the western slopes of the Andes in the province of Cautin. Its elevation is about 500 meters; the climate slightly marine.

Domeyko: A semiarid range of mountains in the northern part of the province of Atacama. They reach a height of over 4,000 meters. It is not known from what part of the range the specimens came.

El Tofo: A town located about 10 miles in from the ocean along the semiarid coast of northern Coquimbo. Its elevation is between 500 and 1,000 meters.

El Vergel: A town located somewhere near Angol in the province of Bio Bio. See Angol.

Fundo Hualpencillo: A town somewhere near Concepcion in the province of Concepcion. See Concepcion.

Las Condes: A town in the province of Santiago, but its exact location is not known. See Santiago.

Las Tundras: A small town near Chillan, the capital of the province of Nuble. Chillan is located in the central valley at an elevation of less than 200 meters. The climate is mediterranean.

Mafil: A town located in the central valley of the province of Valdivia at an elevation of less than 200 meters. It is along the railroad connecting Valdivia with Cautin. The climate is marine.

Nahuelbuta Hills: Part of the coastal range west of Angol in the province of Bio Bio. The mountains are under 1,000 meters elevation. The climate is slightly marine.

Puerto Corral: An ocean port in the province of Valdivia just south of the city of Valdivia. The climate is marine.

Puerto Montt: A port on the Gulf of Ancud in the northern part of the province of Chiloe. The climate is marine.

Punta Teatino: A small village located along the semiarid coast of Coquimbo just north of La Serena.

Santiago: The capital of Chile, located in the province of Santiago. The mountains in the province reach a height of about 5,000 meters. The climate is mediterranean. The city of Santiago is located in the beginning of the central valley at an elevation of about 500 meters. Some specimens with this locality are known to have been taken near the city; others from elsewhere in the department.

Talcaguano: A coastal village just north of the city of Concepcion in the province of Concepcion. The climate is transitional from mediterranean to marine.

Traiguen: A town in the central valley in the northern part of the province of Cautin. Its elevation is under 200 meters. The climate is slightly marine.

Valparaiso: The chief sea port of Chile, being the port of entry for Santiago. It is located in the southern part of the province of Aconcagua. The climate is mediterranean.

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The PERUVIANA Complex

Tachymenis peruviana Wiegmann

Plate 2, fig. 2; Plate 3, figs. 5–9.

1835 *Tachymenis peruviana* Wiegmann, N. Acta. Ac. Leop.-Carol., **17**, p. 252, pl. 20, fig. 1 (type locality=Peru). *Ophis peruviana* Fitzinger, 1843, Syst. Rept., pt. 1, p. 28. *Tachymenis peruviana* Peters, 1863, Monatsb. K. Preuss. Akad. Wissensch. Berlin, p. 275 (in part).[1] Boulenger, 1896, Cat. Sn. Brit. Mus. Nat. Hist., **3**, p. 118 (in part: Aschiquiri, Bolivia; Larecaja, Bolivia; Lake Titicaca). Barbour and Noble, 1921, Proc. U.S. Nat. Mus., **58**, p. 618 (in part: Pucyura[2] at 9,500 feet, Chospiyoc at 10,000 feet, Huarocondo at 11,000 feet, Ollantaytambo at 9,400 feet — all localities in the department of Cuzco, Peru). Escomel, 1929, Fauna de Arequipa, p. 9. Amaral, 1930, Mem. Inst. Butantan Sao Paulo, **4** (1929), p. 210 (in part). Hellmich, 1938, Rev. Chilena Hist. Nat., **41**, p. 108 (in part: Bolivian localities — Carquayeoleo near Rio Muleto in the department of Uyuni,[3] Cerro Sapo in the department of Cochabamba, Ayopayo at 3,200 meters in the department of Cochabamba). Schmidt and Walker, 1943, Zool. Ser. Field Mus. Nat. Hist., **24**, pp. 290, 315 (in part: city of Arequipa in Peru and some of the other specimens believed to be from the department of Madre de Dios in Peru).[4]

1845 *Ophis peruana* Tschudi, Fauna Per., Herp., p. 58 (*nomem nudum*. Tschudi had no specimens. He was merely verifying Fitzinger's placement of *peruviana* into *Ophis*, but misspelled the name).

[1] After this had gone to press my attention was called to another reference to *T. peruviana* as follows; Garman, 1875, Bull. M.C.Z., **3**, p. 278 (Cuzco Valley).

[2] This town is spelled "Puquiura" on the maps of the American Geographical Society.

[3] See footnote 1, p. 20.

[4] One other reference to *Tachymenis peruviana* in the literature results from a misidentification of the specimen: Amaral, 1925, Proc. U.S. Nat. Mus., **67**, Art. 24, p. 14 (U.S.N.M. 12277 from Guayaquil, Ecuador = *Dryophylax nattereri* Mikan).

1854 *Dipsas chilensis* Duméril and Bibron (not of Schlegel) Erpét. Gén., **7**, p. 1159 (in part).

1901 *Tachymenis peruviana* var. *dorsalis* Werner, Abhandl. und Berich. Kon. Zool. Anthrop.-Ethnog. Mus. Dresden, **9**(2), p. 8 (type locality = Bolivia).

1915 *Leimadophis andicolus* Barbour, Proc. Biol. Soc. Washington, **28**, p. 149 (type locality = Huispang at 12,175 feet, department of Cuzco, Peru).

Wiegmann (1835) does not give a specific type locality for *peruviana*, so it is here restricted to the city of Puno in the department of Puno. The choice of Puno is based on the fact that Dr. F. J. F. Meyen, who collected the type specimen during his trip around the world in 1830–32, mentions visiting this city in an account of his travels (1834). Moreover, specimens from Puno agree very well with the figure and description of the type. The type was probably a female judging by scale count and tail shape. Because of the importance of *peruviana* as the type of the genus, it is redescribed in detail on the basis of specimens from Puno. These are then compared with specimens from other parts of the range to determine the amount of variation.

Material Examined. A total of 111 specimens (55 ♀, 56 ♂) referable to *peruviana* have been studied. A list of the localities from which they came follows:

Peruvian Localities:

Department of Arequipa
- Arequipa: 1 ♀, 1 ♂ (C.M.N.H. 34055, 34061)
- Vitor: 1 ♂ (C.M.N.H. 34260)
- Yura: 2 ♂ (C.M.N.H. 34201–2)

Department of Ayachucho
- Huanta: 6 ♀, 6 ♂ (C.M.N.H 39647–58)

Department of Cuzco
- Chospiyoc: 1 ♂ (U.S.N.M. 60740)[1]
- Cuzco and the Cuzco Valley: 4 ♀, 3 ♂ (C.M.N.H. 40216–19, M.C.Z. 3584–86)[1]
- Huarocondo: 4 ♀, 2 ♂ (M.C.Z. 12412–3; U.S.N.M. 60697–8, 60722)[1]
- Huispang: 2 ♂ (M.C.Z. 10986–87)[2]
- Ollantaytambo: 1 ♀ (U.S.N.M. 60743)[1]
- Puquiura: 2 ♀, 1 ♂ (U.S.N.M. 60681–3)[1]
- Sicuani: 1 ♀ (A.M.N.H. 36154)
- Urco: 4 ♀, 3 ♂ (C.M.N.H. 34105–07, 34131–33, 34142)

Department of Junin
Pachacayo: 2 ♀, 2 ♂ (M.C.Z. 42435–38)
Yanama: 1 ♂ (M.C.Z. 45916)
Department of Lima
Yauyos: 1 ♀, 1 ♂ (M.C.Z. 45914–15)
Department of Madre de Dios: 3 ♀, 4 ♂ (C.M.N.H. 40070, 40073–78)[1]
Department of Moquegua
Cuajones: 3 ♀, 4 ♂ (M.C.Z. 46651–57)
Department of Puno
Chucuito: 1 ♀, 1 ♂ (C.M.N.H. 40214–15)
Collacachi: 2 ♀, 4 ♂ (C.M.N.H. 34156–61)
Huacullani: 1 ♀ (C.M.N.H. 40213)
Juliaca: 1 ♀ (C.M.N.H. 34086)
Pisacoma: 1 ♀ (C.M.N.H. 40212)
Pucara: 1 ♀, 2 ♂ (M.C.Z. 45903–05)
Puno: 2 ♀, 3 ♂ (A.M.N.H. 36155, C.M.N.H. 34259, U.S.N.M. 109015–17)[3]
San Anton: 2 ♀, 1 ♂ (A.M.N.H. 5256, C.M.N.H. 4065–66)
Yunguyo: 11 ♀, 10 ♂ (C.M.N.H. 40174–94)
Department of Tacna
Toquepala: 1 ♂ (M.C.Z. 45941)

Bolivian Localities:

Department of Santa Cruz
Santa Cruz de la Sierra: 1 ♀ (A.M.N.H. 8793)

Diagnosis. This species is the type of the genus *Tachymenis*, and forms the basis of the *peruviana* complex. The characters of this complex have been discussed in the introduction. *T. peruviana* differs from other members of the group chiefly in having 19 midbody scale rows, dorsal scales with single apical pits, and generally a distinctly spotted color pattern.

Description of topotypes. Five topotypes have been examined. All are from the city of Puno in the department of Puno. These specimens are A.M.N.H. 36155, a male collected by Beck; C.M.N.H. 34259, also a male collected by K. P. Schmidt on October 28, 1939; U.S.N.M. 109015–17, one male (109016) and two females collected by J. Soukup.

All are snakes of moderate size. The body is rather stocky and cylindrical with a more or less oval shaped head that is only slightly distinct from the neck. The eye is of moderate size with a pupil that is sub-

elliptical in shape. The hemipenis is bifurcate with a bifurcate ductus spermaticus. Its tip is covered with small spines which fuse at their bases giving a slightly calyculate appearance. The body of the hemipenis is covered with larger spines of subequal size. There are no greatly enlarged basal spines, but there are a few scattered minute ones. The three topotypes whose dentition was examined have 6 solid maxillary teeth which are subequal or increase slightly in size posteriorly. These are followed after a gap by a pair of enlarged grooved fangs. The mandibular teeth decrease in size posteriorly after the first few.

The rostral is broader than deep, slightly visible from above; internasals a bit shorter than the prefrontals; frontal 1½ times as long as broad, longer than its distance from the end of the snout, as long as the parietals; supraocular of normal size; nasal entire or semi-divided; loreal as deep as long or a bit deeper; 1 preocular reaching the top of the head but not contacting the frontal; 2 postoculars in three of the specimens, 1 in the other two; temporals 2–3 in half the cases, 1–2 or 1–3 in the others; supralabials 8(4–5); infralabials 9 in most of the specimens with the first four in contact with the anterior pair of chin shields which are as long or longer than the posterior pair, but combinations of 8(3) and 10(5) were also found.

The dorsal scales are smooth, have single apical pits, and a reduction pattern that is typically 19–19–15, but one specimen has only 14 preanal rows. The abdominals are rounded, 141–147 in females and 144–147 in males; anal divided; caudals paired, 43–45 in females and 47–51 in males; total ventrals 186–190 in females and 191–198 in males.

The dorsal ground color of these snakes is light brown or grey dusted with black. In addition, most of the dorsal scales bear a single black apical dot which is about the size of and in the general position of the apical pit. There is a short light middorsal line on the neck. This narrows posteriorly and breaks up into a series of small middorsal spots. There is a short black stripe on either side of the midcervical line. Posteriorly this too breaks up into a series of spots. These spots are of moderate size and dark. Those of opposite sides alternate a bit and some fuse across the midline forming faint zigzag markings. Laterally, on scale rows four and five, there is another series of dark spots which fuse posteriorly to form a dark lateral line. The head

[1] Some of these specimens have already been discussed in the literature which is listed in the synonymy.

[2] Type and paratype of *Leimadophis andicolus* Barbour 1915. This specimen was reidentified as *Tachymenis peruviana* by Barbour and Noble in 1921.

[3] Topotypes of *peruviana*.

coloration is also brownish or grey with irregular dark markings. A small black line runs from the snout through the eye to the angle of the mouth. It is best developed behind the eye. A similar line extends from the parietals to the angle of the jaw. There is a small black mark under each eye. The supralabials may also have a few other dark markings, and the infralabials and gulars a few scattered ones as well. The ventral ground color is light grey or yellow. The abdominals and caudals are covered with irregular dark brown or black markings. The markings in the center of the abdominals and caudals are scattered, but laterally they tend to form a line.

The largest topotype, a female, has a total length of 375 mm.; tail 65 mm. The ratio of tail length to total length is 0.16–0.17 in the female topotypes; and 0.18 in the males.

Variation. The remaining material agrees very well with the topotypes as regards major characters, but differences in detail are common. The body form, penial characters (fig. 2), and dentition are the same in all. The number of solid maxillary teeth ranges from 6–10 and averages 8 in twenty specimens which have been examined from various parts of the range. The type was said to have 5 such teeth.

There are also some differences in the proportions and number of cephalic plates. The internasals are either as long as or shorter than the prefrontals; frontal 1½ to 2 times as long as broad, longer than its distance from the end of the snout, about as long as the parietals but it deviates a bit in either direction; nasal single or semidivided, rarely divided. Generally there is only 1 preocular, but 2 are present in 16 head halves. Typically there are 2 postoculars, but these fuse with one another or with a supralabial to form 1 in 18 head halves. The temporal formula is 2–3 in the majority of cases, but variations are common. Combinations of 1–2, 1–3, 2–2, and 2–4 occur in 65 head halves. Nearly all of these combinations could easily have been derived from a basic 2–3 pattern. The supralabials typically have a formula of 8(4–5). However, two of the first labials have fused in 13 head halves to give a combination of 7(3–4), one other specimen has a count of 8(3–4–5) on one side of the head, and in two additional cases a preorbital labial has divided to give a formula of 9(5–6). There are usually 9 infralabials, the first 4 or 5 of which contact the anterior pair of chin shields, but variations of 8(3), 10(4), 10(5), and 10(6) occur in 28 head halves.

The dorsal scales in all specimens are smooth and have a single apical pit, but the pit is very poorly developed in certain populations. Only a small amount of variation is encountered in the reduction

pattern of the dorsal scales. One specimen has 17 cervical rows and two others have 20. Only one deviates at midbody with a count of 18. Four specimens have 16 or 17 preanal rows, but in half of these the number is reduced to the typical 15 a bit posteriorly. Two specimens have as few as 14 preanal rows. The number of female abdominals ranges from 134-152 with an average of 144; males 136–158, average 148. The anal plate is divided in all, and the left portion generally overlaps the right, but the reverse is the case in two mutant individuals, and there is a partial fusion of the two halves in another specimen. The female caudal range is 37–50, average 42; males 44–55, average 49. These caudals are typically paired, but in eight cases 2–6 were single. The female total ventral range is 176–196, average 186; males 184–209, average 197. Scale counts reported in the literature lower the male abdominal and caudal range to 135 and 37 respectively, but do not otherwise affect the above observations.

The majority of the specimens are quite similar to the topotypes in general color pattern, but may differ in a few details. The typical coloration can be seen in figures 5–7. Variations occur in the row of light middorsal spots which fuse to form a wavy line in many specimens. Other deviations are the failure of any of the large dorsal spots to fuse across the midline; the reduction of the series of lateral spots; more perfuse dark markings on the labials; and a nearly complete absence of dark markings on the abdominals and caudals. Young specimens have a coloration similar to that in typical adults.

Aside from the above departures, several distinct color phases are present in the material at hand. About one half of the Madre de Dios specimens are so melanistic that the typical pattern can only be detected with difficulty (fig. 9). The specimens from Puquiura are also quite dark and in addition have a third dark diagonal line on the head. This one extends from the first supralabial to the middle of the infralabials. In specimens from Yauyos (Lima), Chospiyoc (Cuzco), Huispang (Cuzco), and Bolivia the light middorsal line and dark lateral lines are very pronounced, and the dark dorsal spots are a bit larger than usual (fig. 8). As near as can be told from the description, this race was first noticed in Bolivia by Werner (1901) and described by him as *dorsalis*. However, its reappearance in scattered localities shows that the race is not tenable. It would similarly be unwise to name the other color varieties for they occur with or near typical members, and are identical with them in other characters. The only conclusion that can be reached is that *peruviana* is very polychromatic.

The females examined have an average total length of 368 mm.,

tail 59 mm.; in males the total length averages 405 mm., tail 72 mm. The largest female was taken at Urco and has a total length of 626 mm., tail 99 mm. The largest male is from Vitor and has a total length of 656 mm., tail 111 mm. The ratio of tail length to total length ranges from 0.14–0.18 in the females, and from 0.16–0.21 in the males.

Range. From the above data it is apparent that *peruviana* is a snake of the Central Andes. Its range extends from the departments of Junin and Lima in central Peru south along the Andean chain to southern Bolivia.[1] Actual localities at which the species has been taken can be found in the list of literature and material examined. It is a fairly common snake, but appears to be most abundant in the Andes of southern Peru. This, however, may only be a result of more extensive collecting in that area. It has reached an elevation in southern Peru of nearly 4,000 meters at several points: Huacullani, Pisacoma, San Anton. It is thus essentially a highland form, but it does extend from the upland valleys and plateau down on both sides of the Andes. The lowest point it is known to have reached on the west coast is at Vitor (1630 meters), but it has been taken as low as Santa Cruz in Bolivia (c. 500 meters) on the east side. The vegetation in all of these regions consists primarily of grass steppes as will be discussed later.[2]

Remarks. As can be seen from the above discussion, *Tachymenis peruviana* is a wide spread form even when it is considered in the restricted sense used in this paper. Its range extends along the Andean chain for nearly 1,000 miles. Most of the specimens in this area are found in the highland valleys, but the species can apparently migrate to a certain extent from one valley to another. This seems to be enough to scatter the variation and keep the species intact. Because of the semi-isolation of each population, the variation is widely scattered and not arranged in any clinal sequence. This is characteristic of species in mountainous regions. Each population differs from neighboring ones noticeably in both squamation and coloration, and some, such as those from Puquiura and Madre de Dios, differ enough to be regarded as incipient races. However, it is dangerous to name such forms. *Tachymenis peruviana* would be an excellent form for the study of speciation in mountainous areas. Although 111 specimens have

[1] The southernmost record appears to be Carquayeoleo (Hellmich, 1938). I can not find this town, but it is said to be near Rio Muleto in the department of Uyuni. No department of Uyuni is shown on the American Geographical Society's maps. The only clue I can find to the location of Carquayeoleo is a town of Uyuni in the department of Potosi. This town is near a Rio Mulatos.

[2] After this was written, my attention was called to a specimen from Bom Jesus de Lapa, Bahia, Brazil (Carnegie Museum 347) which was identified by Griffin (1916) as *Tachymenis peruviana*. I have reexamined this specimen and agree with the identification, but am skeptical as to the accuracy of the locality record.

been examined, most are from southern Peru. The other parts of the range are poorly known.

Tachymenis tarmensis spec. nov.

Plate 4, figs. 10, 11.

Type. C.M.N.H. 5698, an adult female from Tarma in the department of Junin, Peru. It was collected by M. P. Anderson on May 19, 1914.

Diagnosis. It is a *Tachymenis* closely related to *peruviana*, but differing in having a few more solid maxillary teeth (12 as opposed to a maximum of 10 in *peruviana*), a few more caudals (55 as opposed to a maximum of 50 in females of *peruviana*) which causes the ratio of tail length to total length to be higher, absence of scale pits, and a very light dorsal ground color with practically no trace of a pattern.

Description of type. The body form, pupil shape, and dentition are quite similar to the corresponding characters of *peruviana.* There are however, 12 solid maxillary teeth.

The rostral is broader than deep, visible from above; internasals about as long as the prefrontals; frontal twice as long as broad, longer than its distance from the end of the snout, as long as one and shorter than the other parietal; supraocular about the size of the frontal; nasal entire; loreal a bit longer than deep; 1 preocular; 2 postoculars; temporals 2–2; supralabials 8 (4–5); infralabials 9(5) on the right side and 8(4) on the left; anterior chin shields longer than the posterior.

The dorsal scales are smooth, lack apical pits, and have a reduction pattern of 19–19–15. The abdominals are rounded, 135; anal divided; caudals 55, 3 being single and the rest paired; total ventrals 190.

The top of the head and body is nearly uniform greyish brown in color (figs. 10–11). There is no trace of a pattern except for a bit of black at the base of a few of the dorsal scales. The color of the underside is grey stippled with black. This stippling becomes heavier posteriorly.

The snake has a total length of 393 mm.; length of tail 83 mm.; ratio of tail length to total length 0.21.

Remarks and Range. This form resembles *peruviana* in general structure. It differs only a bit in such quantitative characters as number of teeth, number of caudals, and in the ratio of tail length to total length. Its chief departure is in the absence of scale pits which are often very poorly developed in *peruviana*, and in its unusual coloration. Using this degree of difference and its geographic position at the

northern part of the range of *peruviana* as criteria, one would expect *tarmensis* to be a race of *peruviana*. Perhaps it is, but until males become available to check on penial characters it is best considered as a full species belonging to the *peruviana* complex. It is probably a rather obscure form, for it is only represented by the type from Tarma, and the Tarma region is quite well known.

Tachymenis affinis Boulenger

Plate 4, fig. 12.

1896 *Tachymenis affinis* Boulenger, Cat. Sn. Brit. Mus., **3**, p. 319, pl. 7, fig. 1 (type locality = Muna[1], Peru). Amaral, 1930, Mem. Inst. Butantan Sao Paulo, **4** (1929), p. 209.

1921 *Tachymenis peruviana* Barbour and Noble (not of Wiegmann), Proc. U.S. Nat. Mus., **58**, p. 618 (part: Cedrobamba ruins[2] at timber line, 12,000 feet, department of Cuzco, Peru).

Material. *Tachymenis affinis* has previously been known by the single type in the British Museum. One additional specimen turned up during an examination of material from the National Museum. This specimen, U.S.N.M. 60721, an adult male, was collected at the Inca ruins of Macchu Picchu in the department of Cuzco, Peru by E. Heller in June 1915 while he was a member of the National Geographic Society — Yale University Peruvian Expedition. It was first identified as *peruviana* by Barbour and Noble (1921) in their report of the Expedition's reptiles. But since it has 17 midbody scale rows and a reduced color pattern, there is little doubt but that it is *affinis*. This specimen enlarges our knowledge of this rare species. It is described and compared with the type below.

Diagnosis. It is a *Tachymenis* differing from all other members of the genus in having a dorsal scale reduction pattern of 17–17–15 instead of 19–19–15. It further differs from *peruviana* in having a reduced color pattern, but resembles it so much in other features that it has been included in the *peruviana* complex.

Description. *T. affinis* is similar to *peruviana* in body form, penial characters, and general dental pattern. The specimen in question has 9 solid maxillary teeth that are subequal in size and are followed after

[1] Stiglich (1922) cites two localities with this name in Peru — one along the northern coast of Ancash, and one on the upper part of the Rio Huallaga in Huanuco. I am not sure which is the type locality but it is probably the latter since the latter is the larger of the two and is in the highlands (2,000–2,500 meters).

[2] This specimen (U.S.N.M. 60721) is discussed below. The Cedrobamba ruins are now better known as the ruins of Macchu Picchu.

a gap by a pair of enlarged grooved fangs. The type had 15 solid maxillary teeth. This may seem like a great discrepancy, but the maxillary range in *peruviana* is at least 5–10.

The cephalic plates of the specimen examined are quite similar to those of *peruviana* except that the frontal is only $1\frac{1}{3}$ times as long as broad, and is shorter than the parietals. The nasal is semidivided. There is 1 preocular; 2 postoculars; temporals 2–2 on the right side, shrivelled on the left; supralabials 8(4–5); infralabials 9(5). The cephalic plates in the type were essentially the same. Its temporals were 2–3.

The dorsal scales are smooth, have single apical pits, and a reduction pattern of 17–17–15. The abdominals are rounded, 147; anal divided; caudals 50, 6 of these are single and the rest paired; total ventrals 197. The type, also a male, had 153 abdominals, 57 caudals, and 210 total ventrals.

As can be seen, the specimen of *affinis* from Macchu Picchu agrees very well with the type in the above characters, but it does differ a bit in coloration. Both are brownish above, but the dorsal scales are darker than the lateral ones in the Macchu Picchu specimen (fig. 12) while the lateral scales are said to be darker in the type. However, I do not believe that this is too significant for the color pattern of both specimens seems to have been derived from a condition similar to that in *peruviana* by a process of reduction of the prominent dark stripes and spots. Both specimens have fair remnants of the head markings of *peruviana*. The type has traces of the rows of dark dorsal spots. These are obscure in the Macchu Picchu specimen, but traces of the light middorsal line can be seen. Both lack the black apical dots that are so prominent in the dorsal scales of *peruviana*. The ventral scales of the Macchu Picchu specimen are darker than in the type.

The snake examined has a total length of 454 mm.; tail 84 mm.; ratio of tail length to total length 0.18. The type was a bit larger, and had a ratio of 0.21.

Remarks and Range. *T. affinis* appears to be a very rare form of the highland valleys of Peru whose range is known to extend from Muna in Huanuco to Macchu Picchu in Cuzco. It must consequently overlap a large part of the range of *peruviana* although the two have not yet been taken together. This fact together with the marked difference in the reduction pattern of the dorsal scales precludes the possibility of the two forms being races of the same species. There is no doubt that *affinis* is a separate species, but I have placed it in the *peruviana* complex since the two are so close in penial characters.

The ATTENUATA Complex

Tachymenis attenuata attenuata spec. et subsp. nov.

Plate 2, fig. 3; plate 4, figs. 13–15.

1943 *Tachymenis peruviana* Schmidt and Walker (not of Wiegmann), Zool. Ser. Field Mus. Nat. Hist., **24**, p. 290 (in part: some of Peruvian specimens).

Type. C.M.N.H. 40071, an adult male collected by Sr. Juan Perea, and originally deposited in the University of Arequipa. The specimen has no further data than Peru, but such material in the University's collection is believed to be from the department of Madre de Dios (Schmidt and Walker, 1943).

Diagnosis. It is a *Tachymenis* differing from members of the *peruviana* complex primarily in its more attenuate body proportions. This results in a greater number of caudals and total ventrals, and in a greater ratio of tail length to total length. Other differences can be found in the condition of the hemipenis, and in the dentition. All of these have been discussed in the introduction. This race differs from *boliviana*, to be described, in having a slightly lower number of solid maxillary teeth (12-14 as opposed to 14–16), and of abdominals and caudals (in males 148–150 and 60–64 as opposed to 152 and 69), and in having a speckled instead of a checkered color pattern.

Description of type. The body form is quite attenuate in comparison with *peruviana;* subeliptical in section. The head is moderately distinct from the neck. The eye is of average size with a subeliptical shaped pupil. The hemipenis (fig. 3) is bifurcate with a bifurcate ductus spermaticus; tip distinctly calyculate with only slight indications of spines at the top of the folds; body spinose with the length of the spines increasing posteriorly; base with a row of 4 very large spines followed by a few scattered minute ones. There are 12 solid maxillary teeth which increase slightly in size posteriorly and are followed after a gap by a pair of enlarged fangs; mandibular teeth decrease in size posteriorly after the first few.

The rostral is broader than deep, visible from above; internasals shorter than the prefrontals; frontal 1½ times as long as broad, longer than its distance from the end of the snout, distinctly shorter than the parietals; supraocular of normal size; nasal entire; loreal deeper than long; 1 preocular extending to the top of the head but not contacting the frontal; 2 postoculars; temporals 2–2; supralabials 8(4–5); 8 in-

fralabials with the first 5 in contact with the anterior pair of chin shields which are as long as or longer than the posterior pair.

The dorsal scales are smooth, lack apical pits, and have a reduction pattern of 19–19–15; abdominals rounded, 150; anal divided; caudals paired, 60; total ventrals 210.

The ground coloration above and below is a light brown which is so heavily stippled and flaked with black that the general appearance is dark grey. However, upon careful examination traces of a pattern similar to that of *peruviana* can be seen beneath all of this. (See figs. 13–15). These traces are especially prominent on the head and neck, for a diagonal black line runs from the eye to the corner of the mouth, a second one extends from the parietals to the angle of the jaw, and there is a distinct black stripe on either side of the midline on the back of the neck. A small black line also runs along the sides of the belly but becomes obscure posteriorly for the general black stippling becomes very dense.

The specimen has a total length of 582 mm.; tail 126 mm.; ratio of tail length to total length 0.22.

Notes on paratype. On paratype, C.M.N.H. 40072, also an adult male has the same data as the type. It is also quite similar to the type in general body form, penial characters, and dentition. It has 7 large basal spines on the hemipenis, and 14 solid maxillary teeth. The cephalic plates are the same with the exception of minor differences: 2 preoculars; temporals 2–3 on the right side and 2–2 on the left; infralabials 8(5) on the right side and 9(5) on the left. The dorsal scales have the same reduction pattern, but have traces of two apical pits! There are 148 abdominals, 64 caudals, and 214 total ventrals. The greatest departure is in coloration. The head, neck and belly are similar to the type, but the back is a nearly uniform light greyish brown with a minimum of black stippling and flaking. Its general appearance is close to that of *tarmensis*. The paratype has a total length of 581 mm.; tail 131 mm.; ratio of tail length to total length 0.23.

Remarks and Range. The slight indication of scale pits in the paratype is puzzling. This fact together with the aberrant color might warrant the recognition of this specimen as a separate form, but this does not seem advisable at this time for the two resemble each other in all other characters, and *Tachymenis* is known to be very polychromatic and to show some variation in terms of scale pits.

It is unfortunate that more specific locality data are not available for this race. Both this form and *peruviana* are found in the department of Madre de Dios. Its more elongate body form suggests the

possibility that it is a tropical lowland type, while *peruviana* may come from the mountains in the southern part of the department.

Morphologically, *a. attenuata* resembles *tarmensis* in the greater number of solid maxillary teeth, lack of scale pits (at least in the type), and greater number of caudals. But this does not necessarily indicate relationship. *T. tarmensis* is presumably a local northern form so the two are separated by a large geographic hiatus. Furthermore, although the coloration of *a. attenuata* is variable it is nearer to that of *peruviana* than to that of *tarmensis*. Its resemblances to *tarmensis* could easily have been arrived at through parallel evolution. It seems more probable that both *attenuata* and *tarmensis* evolved independently from *peruviana* stock.

Tachymenis attenuata boliviana subsp. nov.

Plate 4, fig. 16.

Type. A.M.N.H. 36020, an adult female taken at an elevation of 2,500 meters at Incachaca in the department of Cochabamba, Bolivia by J. Steinbach.

Diagnosis. It is a *Tachymenis* which resembles *a. attenuata* very closely. As mentioned above, it differs primarily in coloration, but this is supplemented by slight differences in the number of solid maxillary teeth, abdominals, and caudals.

Description of type. The general body form, pupil shape, and dentition are the same as in *a. attenuata*. There are, however, 16 solid maxillary teeth.

The proportions of the cephalic plates are also the same. There are 2 preoculars; 2 postoculars; temporals 2–3; supralabials 8(3–4–5); infralabials 10(5) on the right and 9(4) on the left.

The dorsal scales are smooth, lack apical pits, and have a reduction pattern of 19–19–15; abdominals rounded, 149; anal divided; caudals paired, 61; total ventrals 210.

The color pattern (fig. 16) is closer to the color of *peruviana* than is that of *a. attenuata*. The dorsal ground color is light brown. On either side of the light middorsal line, there is a row of fairly large uniformly shaped dark spots. Those of opposite sides alternate with one another, fuse with one another at their corners across the midline, and also alternate with and fuse with a less distinct row of lateral spots. The net result is a checkered pattern which is especially prominent anteriorly. The various rows of spots can be easily homologized with

similar rows in *peruviana*, but the spots are not as large and generally do not fuse in *peruviana*. The underside is a light brown flaked with black. Anteriorly these black markings are arranged into four longitudinal lines, but posteriorly they merge with the darkened ground color. The head and neck markings are the same as in typical *peruviana*.

The type has a total length of 576 mm.; tail 125 mm.; ratio of tail length to total length 0.22.

Notes on paratypes. Two paratypes A.M.N.H. 36015 (female) and A.M.N.H. 36017 (male) have the same data as the type. The female specimen resembles the type very closely. It has 14 solid maxillary teeth. There is 1 preocular; 2 postoculars on the left side and 1 on the right; temporals 2–3; supralabials 9(5–6); infralabials 9(4) on the left side and 9(5) on the right. There are 156 abdominals; 65 caudals, and 221 total ventrals. The coloration is the same as in the type. The specimen has a total length of 630 mm.; tail 142 mm.; ratio of tail length to total length 0.23.

The male specimen is also quite close. It has 16 solid maxillary teeth. Its hemipenis is similar to that of *a. attenuata*, and has 7 large basal spines. There is 1 preocular; 2 postoculars; temporals 2–3; supralabials 8(4–5); infralabials 9(5). The dorsal scales, however, are unusual in that there is an indication of a single apical pit. There are 152 abdominals; 69 caudals; 221 total ventrals. This specimen is very melanistic, so only traces of the checkered pattern and head-neck markings can be seen. Its total length is 661 mm.; tail 162 mm.; ratio 0.24.

Remarks and Range. As in *a. attenuata* the indication of scale pits and the aberrant coloration of one of the paratypes presents a problem. It is probably merely an example of the variability of these characters, but more material is needed to be sure. The presence of a pit in a minority of the population may indicate the recent derivation of this form from pitted ancestors.

There is little doubt in my mind that typical *attenuata* and *boliviana* are two races of the same species despite the present lack of intergrades for they have so many features in common. As a matter of fact, their separation is merely a function of coloration (a variable character) supplemented by minor differences in teeth and scale counts. Both races are probably found along the edge of the tropical lowlands of the Amazon basin — *attenuata* being a northern race and *boliviana* a southern one.

The CHILENSIS Complex

Tachymenis chilensis chilensis (Schlegel)

Plate 2, fig. 4; plate 5, figs. 17–19, 21.

1837 *Coronella chilensis* Schlegel, Phys. Serp., **2**, p. 70 (type locality = Chile). Guichenot, 1854, *in* Gay, Hist. Chile, Zool. **2**, p. 79, pl. 4, fig. 1 (Valdivia and Colchagua, Chile). *Dipsas chilensis*, Duméril and Bibron, 1854, Erpét. Gén., **7**, p. 1159 (in part: Chile). *Tachymenis chilensis* Girard, 1854, Proc. Acad. Nat. Sci. Philadelphia, p. 226 (Santiago, Chile). Girard, 1855, U. S. Naval Astron. Exped., **2**, p. 213, pl. 37, figs. 1–6 (Santiago, Chile). Günther, 1858, Cat. Colubr. Sn., p. 34 (Colchagua and Tichitata in Chile, and Chile). Cope, 1860, Proc. Acad. Nat. Sci. Philadelphia, p. 247 (Talcahuano[1] and Quinquina Id., Chile). *Mesotes chilensis* Jan, 1863, Arch. Zool. Anat. Fisiol., **2**, p. 308 (Chile). Jan, 1866, Icon. Gén. des Ophid., **18**, pl. 6, fig. 2 (Chile).

1863 *Tachymenis peruviana* Peters (not of Wiegmann), Monatsb. K. Preuss. Akad. Wissensch. Berlin, p. 275 (in part). Steindachner, 1867, Novara Rept., p. 62 (Chile). Boulenger, 1896, Cat. Sn. Brit. Mus. Nat. Hist., **3**, p. 118 (in part: Colchagua and Talcahuana[1] in Chile, southern Chile, Chile). Werner, 1896, Verhandl. der K.K. Zool.-Bot. Gesellsch. Wien, **46**, p. 356 (Frutillar, Chile). Amaral, 1930, Mem. Inst. Butantan Sao Paulo, **4** (1929), p. 210 (in part). Hellmich, 1938, Rev. Chilena Hist. Nat., **41**, p. 108 (in part: Puerto Montt in Chile, and some other Chilean specimens). Schmidt and Walker, 1943, Zool. Ser. Field Mus. Nat. Hist., **24**, p. 315 (in part).

1898 *Tachymenis peruviana* var. *vittata*[2] Werner, Zool. Jahrb. Sup., **4**, p. 259, pl. 13, fig. 9c (type locality = Frutillar, Chile). Werner, 1904, Ergeb. Hamburger Magalh. Sammelr., in Naturhistorishes Mus. zu Hamburg, **1**, Rept. und Batr., p. 15 (Coronel, Valdivia, and Puerto Montt, all in Chile).

1898 *Tachymenis affinis* Werner (not of Boulenger), Zool. Jahrb. Sup., **4**, p. 259, pl. 13, fig. 9 d (Chile).

1904 *Tachymenis peruviana* var. *catenata*[3] Werner, Ergeb. Hamburger Magalh. Sammelr., in Naturhistorishes Mus. zu Hamburg, **1**, Rept. und Batr., p. 14 (Estancilla in Valdivia, Chile).

Although Schlegel (1837) based his very brief description of *chilensis* on two specimens collected by M. Lesson and M. Garnot from an unknown part of Chile, the scale count of these snakes and their essen-

[1] This locality is spelled "Talcaguano" on maps of the American Geographical Society.
[2] These specimens were first reported by Werner in 1896 as *peruviana*. See above.
[3] This variety was first described by Werner in 1898 on the basis of specimens from Coquimbo. The type series, judging from locality and coloration, should be referred to *c. assimilis*. The present series, however, appears to be *c. chilensis*.

tially lineate color pattern warrant the restriction of this name as a trinominal to the most common race of the *chilensis* complex. This race occurs in central and part of southern Chile. In as much as it has been poorly defined and is very common, it is redescribed in detail on the basis of the material examined.

Material examined. A total of 57 specimens (26 ♀, 31 ♂) referable to this race have been examined. All are from Chile. A list of the localities from which they came follows. The provinces are arranged in a north-south sequence.

Chile — no further data: 3 ♀, 3 ♂ (C.M.N.H. 23815; M.C.Z. 1978, 2539, 3692; U.S.N.M. 436, 56442)

Province of Aconcagua

20 miles northeast of Valparaiso: 1 ♀ (C.M.N.H. 40117)

Province of Santiago: 1 ♀, 2 ♂ (C.M.N.H. 9943, 9945–46)

In or near Santiago: 3 ♀, 1 ♂ (M.C.Z. 2058; U.S.N.M. 5514, 3 specs.)

Cerro de Aculeo: 1 ♀, 1 ♂ (M.C.Z. 19976–77)

Province of Nuble

Las Tundras: 1 ♀, 1 ♂ (M.C.Z. 6513, 2 specs.)

Province of Concepcion

Concepcion: 2 ♀, 5 ♂ (M.C.Z. 16372–74, C.M.N.H. 3863–66)

Coracol: 1 ♀, 1 ♀ (A.M.N.H. 18328, 18333)

Fundo Hualpencillo: 1 ♀ (C.M.N.H. 31616)

Talcaguano: 5 ♀, 7 ♂ (A.M.N.H. 21159; M.C.Z. 2065 — 2 specs., 2066 — 2 specs., 2540 — 4 specs., 2766)

Province of Bio Bio

Angol: 1 ♂ (C.M.N.H. 23812)

Chiquaihue: 2 ♀ (C.M.N.H. 23808–09)

El Vergel: 1 ♂ (C.M.N.H. 31615)

Nahuelbuta Hills: 3 ♀, 2 ♂ (C.M.N.H. 23810–11, 23813–14, 31614)

Province of Cautin

Curacautin: 4 ♂ (C.M.N.H. 6221–24)

Traiguen: 1 ♀ (C.M.N.H. 31617)

Province of Valdivia

Puerto Corral: 1 ♀, 1 ♂ (A.M.N.H. 36149–50)

Province of Chiloe

Puerto Montt: 1 ♂ (A.M.N.H. 27659)

Diagnosis. A *Tachymenis* which resembles *peruviana* in general body proportions and consequently in scale counts, but resembles *attenuata* in penial characters. Its supralabials are normally 7(3–4). This form has been placed into a separate species complex for these reasons as

has been pointed out in the introduction. This particular race differs from the other two in the *chilensis* complex primarily in having a dorsal color pattern that is distinctly lineate, yet the dark dorsal lines are quite narrow (not over 1 scale wide). *T. c. chilensis* also tends to have more abdominals, caudals, and total ventrals than either *assimilis* or *melanura*.

Description. These snakes are of the same order of size as *peruviana*, have similar body proportions, and pupil shape. The hemipenis (fig. 4), however, resembles that of *attenuata*. It is bifurcate with a bifurcate ductus spermaticus; tip distinctly calyculate with remnants of minute spines on the tips of the folds; body spinose with the spines increasing in length posteriorly; base with a row of very large spines followed by a few scattered minute ones. The number of large basal spines ranges from 4–6 in the specimens studied. The solid maxillary teeth are subequal or increase slightly in size posteriorly. They are followed after a gap by a pair of enlarged grooved fangs. The number of solid maxillary teeth ranges only from 6–7 in the material at hand, but one specimen figured in the literature (Jan, 1866) had 10 such teeth. The mandibular teeth decrease in size posteriorly after the first few.

The rostral is broader than deep, slightly visible from above; internasals shorter than the prefrontals; frontal 1½–1⅔ times as long as broad, a bit longer than its distance from the end of the snout, shorter than the parietals in the adults, but as long as the parietals in the young; supraocular of normal size; nasal entire, rarely semi-divided; loreal longer than deep or as long as deep; preoculars 2, rarely 3, the upper one reaching the top of the head but not contacting the frontal; postoculars 2, rarely 1 or 3; temporals usually 2–3 but variations of 1–2, 1–3, and 2–2 are very common, and combinations of 1–1, 2–4, and 3–2 occur; supralabials normally 7(3–4), but 9 head halves have 8(4–5) and one has 8(3–4); infralabials generally 9 with the first four or five contacting the anterior pair of chin shields which are as long as or longer than the posterior, but combinations of 8(3), 8(4), 10(4), and 10(5) are also found. Aside from one specimen with a single preocular, reports in the literature do not increase the above variation.

The dorsal scales are smooth, have single well developed apical pits, and a reduction pattern that is typically 19–19–15. A bit of variation is encountered in the number of preanal rows. Ten specimens have 16 or 17 preanal rows which are reduced to 15 posteriorly, two specimens have 17 rows which are not reduced, and one specimen has only 14 preanal rows. The abdominals are rounded, female range 148–158,

average 152; male range 152–169, average 159. The anal is divided The caudals are typically paired, but in two cases several are single, female range 37–51, average 43; male range 45–53, average 49. The total ventral range in females is 185–204, average 194; males 197–217, average 208. Scale counts reported in the literature lower the female caudal range to 33 and the male caudal range to 39, but do not otherwise affect the above observations.

Even though the coloration of *c. chilensis* is extremely variable, certain common features can be detected, and similarities with the pattern of *peruviana* be seen. In the majority of cases (fig. 17 and 21) the ground color is a light brownish-grey, and most of the dorsal scales bear a black apical dot about the size of and in the position of the apical pit. The light middorsal line is very pronounced, but there are only traces of the prominent rows of black spots which bordered it in *peruviana*. The spots have been reduced and merely consist of a series of black streaks which are never more than one scale wide. These fuse into a narrow line. In some specimens they are completely lost in the posterior regions. As in *peruviana*, there is another black line on the fourth row of scales, but in *c. chilensis*, this is accentuated by a slight lightening of the ground color immediately above it, and a general darkening of the ground color below it. The head has the typical *Tachymenis* pattern consisting of a dark dash under the eye, a black line extending from the eye to the angle of the mouth, and a similar line extending from the parietals to the angle of the jaw. However, the latter line is somewhat reduced as compared with *peruviana*. The color on the under side is yellowish with numerous irregular black marks. Sometimes these are arranged in a linear manner. Markings are nearly absent on the underside of the chin and tail.

The coloration of very young specimens is essentially the same as just described. But the rows of black dorsal spots or streaks are a bit more pronounced, and it is more apparent that the dark lateral line is composed of a series of fused spots. Young from as far south as Puerto Montt are spotted, but this is not as obvious in their case as in specimens from central Chile.

In a number of specimens (fig. 18), the ground color above and below is quite dark, and the light middorsal line is sharply set off by very distinct black lines. These lines are still only one scale wide. This is the most striking departure, but it is connected to members with the typical pattern by intermediate forms. In a few specimens, the opposite has occurred (fig. 19). The ground color has become very light above the dark lateral line, and all traces of the dark dorsal lines have

been lost. Consequently the light middorsal line tends to blend with the ground color and is not too distinct.

The females have an average total length of 318 mm., tail 50 mm. The largest female, from an unknown part of Chile, has a length of 550 mm., tail 90 mm. Males averages 378 mm. overall, tail 65 mm. The largest male, taken at Concepcion, has a total length of 597 mm., tail 95 mm. In the females, the ratio of tail length to total length is 0.14–0.17; in males 0.15–0.18. A couple of aberrant males, however, extend the range of the latter to 0.13–0.33!

Range. T. c. chilensis is one of the more common snakes of central Chile. Its range extends from the southern part of the province of Aconcagua as far south as Puerto Montt in the province of Chiloe. This includes the mediterranean region of central Chile and some of the forested regions of the south. The race seems to be more abundant in the former area. From the little data available on the vertical distribution of *c. chilensis*, it appears that it extends from sealevel to at least 2,000 meters elevation. It reaches the highest points in the northern part of its range.

Remarks. Geographically, this race occurs between *assimilis* to the north and *melanura* in parts of the south. It is also intermediate in characters. The cline in the number of abdominals, caudals, and total ventrals is lowest in *assimilis*, reaches a maximum in *chilensis*, and falls off a bit in *melanura* as will be seen. The counts of *assimilis* are the closest to *peruviana*. Similar tendencies can be seen in the coloration change; northern *assimilis* is closest to *peruviana*, *chilensis* has a pattern which merely carries the differences in *assimilis* a step further, and *melanura* is the farthest removed from *peruviana*. Evidence of this sort strongly indicates that the entire *chilensis* complex has been derived from *peruviana*.

Tachymenis chilensis assimilis (Jan)

Plate 5, fig. 20.

1858 *Tachymenis chilensis* Girard (not of Wiegmann), U. S. Explor. Exped., **20** Herp., p. 173 (Valparaiso, Chile).

1863 *Psammophylax assimilis* Jan, Arch. Zool. Anat. Fisiol., **2**, p. 311(type locality unknown). Jan, 1866, Icon. Gén. des Ophid., **18**, pl. 1, fig. 2 (Chile).

1896 *Tachymenis peruviana* Boulenger (not of Wiegmann), Cat. Sn. Brit. Mus. Nat. Hist., **3**, p. 118 (in part: Coquimbo, Chile). Amaral, 1930, Mem. Inst. Butantan Sao Paulo, **4** (1929), p. 210 (in part). Hell-

mich, 1938, Rev. Chilena Hist. Nat., **41**, p. 108 (in part: some of Chilean specimens). Schmidt and Walker, 1943, Zool. Ser. Field Mus. Nat. Hist., **24**, p. 315 (in part).

1898 *Tachymenis peruviana* var. *coronellina* Werner, Zool. Jahrb. Sup., **4**, p. 259, pl. 13, fig. 9b (type locality = Coquimbo, Chile). Werner, 1904, Ergeb. Hamburger Magalh. Sammelr., in Naturhistorisches Mus. zu Hamburg, **1**, Rept. und Batr., p. 14 (Valparaiso, Chile).

1898 *Tachymenis peruviana* var. *catenata* Werner, Zool. Jahrb. Sup., **4**, p. 259, pl. 13, fig. 9 a (type locality = Coquimbo, Chile).

In the original citation of *assimilis* (1863) Jan did not know the type locality, and gave a very brief description of the animal. Fortunately however, he subsequently (1866) figured this form on the basis of a specimen from Chile.[1] It is quite clear from this figure that the name *assimilis* should be restricted to the most northern race of *chilensis*. This race is redescribed below on the basis of specimens examined.

Material Examined. Sixteen specimens (7 ♀, 9 ♂) have been studied. A list of the localities from which they came follows:

No data: 1 ♂ (A.M.N.H. 37942)[2]
Chile: 1 ♂ (C.M.N.H. 7004)
Province of Atacama
  Chanarcillo: 1 ♀ (M.C.Z. 6514)
  Domeyko: 1 ♀ (C.M.N.H. 5771)
Province of Coquimbo
  El Tofo: 3 ♀, 2 ♂ (A.M.N.H. 36084–88)
  Punta Teatino: 3 ♂ (A.M.N.H. 64939–41)
Province of Aconcaqua
  Valparaiso: 2 ♀, 1 ♂ (A.M.N.H. 36146–47, U.S.N.M. 5531)
Province of Santiago
  Las Condes: 1 ♂ (M.C.Z. 21211)

Diagnosis. It is a *Tachymenis* clearly belonging to the *chilensis* complex, but differing from the typical race in having a slightly lower number of abdominals, caudals, and total ventrals; and in having a color pattern that is partly spotted and partly lineate.

Description. This race resembles *chilensis* very closely as regards general proportions, hemipenial characters, and dentition. The number of large, basal penial spines ranges from 2–6. There are six or seven solid maxillary teeth followed after a gap by a pair of large, grooved fangs.

The proportions and the disposition of the cephalic plates is also the

[1] The figured specimen may be the actual type, for it agrees with the type description as regards certain abnormalities in the head shields.
[2] This specimen closely resembles those from Coquimbo.

same as in *chilensis* except that the frontal is a bit nearer the length of the parietal. There are two preoculars in every case except for one side of a specimen from Punta Teatino in which the lower preocular has fused with the loreal; postoculars 2; temporals generally 2–3, but a variation of 2–2 is common; supralabials 7(3–4); infralabials generally 9 with the first 4 or 5 in contact with the anterior pair of chin shields which are as long as or longer than the posterior pair, but combinations of 8(3) were found.

The dorsal scales are smooth, have single well developed apical pits, and a reduction pattern of 19–19–15. The abdominals are rounded, female range 141–148, average 146; male range 137–154, average 145. Anal divided. Caudals paired, female range 38–44, average 41; male range 40–49, average 46. The total ventral range in females is 181–190, average 187; males 184–210, average 194.

Records in the literature extend the above variation a bit but not significantly. The figure by Jan (1866) shows 9 solid maxillary teeth and supralabials 8(4–5). The type had both a single preocular and postocular. Counts of Boulenger (1896) would extend the female caudal range to 49, and counts of Werner (1898) would extend their abdominal range to 149.

The color pattern of *c. assimilis* (fig. 20) is intermediate between the spotted pattern of *p. peruviana* and the lineate one of *c. chilensis*. As a rule, the dorsal ground color is a light brownish-grey, and most of the scales have a black apical dot. The light middorsal line is present, but it is frequently broken up into a series of middorsal spots. Anteriorly this line is bordered on each side by a row of fairly large dark spots. Each row begins as a dark streak on the back of the neck. This is the pattern of *p. peruviana;* however, these spots fuse into a line at about the middle of the body. In some cases they may even be fused into a line for the entire length of the body thus giving the lineate appearance of *c. chilensis*. But if this is the case, the resulting line is always more than one scale wide. There is also a distinct black lateral line on the fourth row of scales as is typical for *Tachymenis*. The color of the head and underside is the same as in *c. chilensis*. The most common departure from the above was the blackening of the edges of many of the dorsal scales. This partially obscured the typical pattern. In a couple of other cases, the dorsal ground color was very light and the pattern reduced.

The females examined have an average total length of 316 mm., tail 49 mm. The largest specimen, taken in Valparaiso, measures 510 mm. overall, tail 80 mm. The males have an average total length of 372

mm., tail 66 mm. The largest specimen was from Las Condes. It has a total length of 484 mm. and a tail length of 81 mm. The ratio of tail length to total length ranges from 0.15–0.16 in females; 0.16–0.19 in males.

Remarks and Range. The range of *assimilis* extends from the Province of Atacama in northern Chile south into the Province of Santiago. Thus it is primarily a north-central race, but it extends far enough south to overlap slightly the range of *chilensis*. Both races are found in the Provinces of Aconcagua and Santiago; however, *assimilis* appears to be more common in Aconcagua and *chilensis* in Santiago. To my knowledge, these two races have not been taken at the same locality in this area of overlap. At the northern part of its range, *assimilis* seems to be separated from the Peruvian and Bolivia forms by the severe deserts of the northern parts of Chile and southern Bolivia, but more collecting in these regions is necessary to be certain. The climate encountered by *assimilis* is primarily semiarid, but this race does enter the mediterranean regions of Chile. This race has been collected primarily along the coast, but does extend into the mountains. It has been taken in the Domeyko range, which reaches an elevation of 4,000 meters, but we do not know from what part.

Tachymenis chilensis melanura subsp. nov.

Plate 5, fig. 22.

Type. C.M.N.H. 3874, an adult male collected by C. C. Sanborn between February 14 and 28, 1923 at Mafil, Province of Valdivia, Chile.

Diagnosis. A *Tachymenis* belonging to the *chilensis* complex, but differing from the typical race in having such a great development of melanin that the ground color is very dark and the typical lineate pattern obscure. The race also tends to have a lower number of abdominals, but this difference is not too significant.

Description of type. The general body shape is the same as in most of the forms of *Tachymenis* — of moderate size, cylindrical in section, and an oval shaped head that is only slightly distinct from the neck. The eye is of moderate size with a slightly subeliptical-shaped pupil. The hemipenis is similar to typical *chilensis* being bifurcate with a bifurcate ductus spermaticus; tip distinctly calyculate with small spines on the tips of the folds; body covered with spines that increase in size posteriorly; and 5 very large basal spines followed by a few scattered minute ones. There are 8 solid maxillary teeth which increase

a bit in size posteriorly. These are followed after a gap by a pair of enlarged grooved fangs. The mandibular teeth decrease slightly in size posteriorly after the first few.

The rostral is broader than deep, visible from above; internasals shorter than the prefrontals; frontal 1½ times as long as broad, longer than its distance from the end of the snout, distinctly shorter than the parietals; supraocular of normal size; nasal entire; loreal a bit longer than deep; 2 preoculars, the upper one reaching the top of the head but not contacting the frontal; 3 postoculars; temporals 2–3 on the left side, 2–2 on the right; supralabials 7(3–4); 9 infralabials with the first 4 in contact with the anterior pair of chin shields which are longer than the posterior pair.

The dorsal scales are smooth, have a well developed apical pit, and a reduction pattern of 19–19–15; abdominals rounded, 163; anal divided; caudals paired, 52; total ventrals 215.

The dorsal ground color (fig. 22) is a uniform light black. This naturally tends to obscure any pattern, but upon close examination the remains of the typical *chilensis* one can be seen. There is a faint indication of the light middorsal line bordered by a darker black, and the narrow black line on the fourth row of scales. The latter still has a slight lightening of the ground color just above it. The head too is very dark, but the typical black streaks from the eye to the angle of the mouth and from the parietals to the angle of the jaw, as well as a few dark supralabial markings can still be seen. The ventral color is a dark grey with irregular black markings showing through. These tend to be arranged in a linear manner. The undersides of the tip of the tail and chin are much lighter. There are a few dark markings on the infralabials.

The type has a total length of 394 mm., tail 67 mm.; ratio of tail to total length 0.17.

Notes on paratypes. Seventeen paratypes (8 ♀, 9 ♂) are available (C.M.N.H. 3867–73, 3875–83, 5769). All are from Mafil and bear the same data as the type. This series agrees very well with the type. The number of large basal spines on the hemipenis ranges from 5–8; the number of solid maxillary teeth from 7–8. Most have 7.

The frontal is 1½ to 1⅔ times as long as broad, generally shorter than the parietals but in the younger specimens the two plates are subequal in length; nasal entire, rarely semidivided; loreal either longer than deep or deeper than long; generally 2 preoculars, occasionally 3; generally 2 postoculars, occasionally 3; temporals usually 2–3 or 2–2, but variations of 1–1, 1–2, 1–3, and 3–2 occur; supralabials 7(3–4) in

most cases, but one specimen has 6(3–4) and another 8(4–5); infralabials 9(4) or 9(5) in most, but combinations of 8(3), 10(4), and 10(5) are present in this series; anterior chin shields generally longer than the posterior, but they are the same length in a few cases.

The dorsal scales have a well developed apical pit and a typical reduction pattern of 19–19–15. Two specimens have 16 and 17 preanal rows. In these cases the number is not reduced below 16. Abdominals 147–155 in females, average 150; males 146–163, average 158. Anal divided. Caudals typically paired, but several specimens have 1–3 single; female range 41–51, average 45; males 40–54, average 49. The total ventral range in females is 192–201, average 196; males 195–215, average 207.

Ninety-five per cent of the paratypes have a coloration that is practically identical with that of the type. These are all melanistic, but vary a bit in the degree with which the underlying *chilensis* pattern shows through. The melanism is absent in only one specimen (C.M.N.H. 5769). This one consequently has the typical *chilensis* pattern, but is referred to *melanura* on the basis of locality. No very young specimens are present in the series, but judging from a late embryo removed from C.M.N.H. 3878, the ground coloration would be lighter and the lineate pattern more evident.

The females have an average total length of 444 mm., tail 72 mm.; the largest specimen measures 497 mm. and 90 mm. The males have an average total length of 422 mm., tail 72 mm.; the largest measures 568 mm. and 77 mm. The ratio of tail length of total length ranges from 0.15–0.18 in the females; 0.15–0.18 in most males, but one exceptional specimen has a ratio of 0.13!

Remarks and Range. *T.c.melanura* appears to be an extremely local race found only in the vicinity of Mafil in central Valdivia. It has undoubtedly been derived from *c. chilensis*, which it resembles very closely, by a greater production of melanin. But why there should be such a local melanistic race is hard to say, for the entire region of southern Chile has a marine climate and typical *chilensis* is not only found along the coast of Valdivia but also as far south as Puerto Montt in Chiloe.

This race has progressed a bit farther than *c. chilensis* in the evolution of the color pattern from spotted to lineate, for there is no recapitulation of the spotted type. The late embryo removed from C.M.N.H. 3878 is light brown with a lighter middorsal line bordered by dark lines, and a dark lateral line on each side. These dark lines are complete and not formed by small fusing spots as in young *c. chilensis*.

DISCUSSION

Relationship of the Described Forms

Although the large series of *Tachymenis* discussed above readily separates into three species complexes, there can be no doubt but that they form a compact phylogenetic group. *T. peruviana* seems to be the most primitive type and therefore the one closest to the ancestral stock. Such an ancestral stock probably occupied the Andes of central and southern Peru where *peruviana* is now most abundant. The source of this stock cannot even be guessed at since the relationships of the various genera of South American Boiginae is so poorly known. Perhaps it evolved from a lowland form which worked its way up into the mountains, or perhaps from a form which followed the Andean range south from some northern point. In any case, given an ancestral stock resembling *peruviana* and occupying the Andes of central and southern Peru, lines of evolution to the other forms can be traced. These, however, are necessarily hypothetical.

Probably *affinis* was the first offshoot. It evolved in Peru primarily by a reduction of the number of scale rows from 19–19–15 to 17–17–15. This was accompanied by a marked reduction of the conspicuous *peruviana* color pattern, but not a complete loss (cf. figs. 7 and 12). Judging by the present rarity of *affinis*, it was a small branch, and the remaining portion of the stock stayed more or less unchanged as *peruviana*. The separation of *affinis* was complete. No *affinis-peruviana* intergrades are known even though both forms occupy the Andean region of central and southern Peru. They have even been taken in the same valley (Urubamba) although not at the same locality.

T. peruviana spread widely to all parts of the Andes of central and southern Peru, and into those of Bolivia. It even worked down from the highlands into some of the lower valleys. It has been taken at Vitor (1,630 meters) on the west side of the Peruvian mountains, and on the east side in the department of Madre de Dios in Peru and the city of Santa Cruz (c. 500 meters) in Bolivia. Despite this great spread, it has remained more or less intact. Local populations differ slightly of course, but the differences are widely scattered and not arranged in any clinal sequence. Apparently *peruviana* can reach high enough elevations to cross mountain passes and allow the various populations to intermingle to a certain extent. The capture of a number of specimens on the upland plateaus at nearly 4,000 meters elevation where the vegetation is distinctly alpine indicates that this is true. Most speci-

mens, however, prefer the region of grassy steppes at elevations which are a bit lower.

But despite this ability to intermingle, *peruviana* did give rise to a small offshoot — *tarmensis* — at the extreme northern part of its range. *T. tarmensis* is known only from the vicinity of Tarma in Junin. Its separation from *peruviana* is not as well marked as in *affinis*. Its evolution has been a function of an increase in the number of solid maxillary teeth from a maximum of 10 in *peruviana* to 12, loss of the apical pit in the dorsal scales which is already poorly developed in certain *peruviana* populations, a slight increase in the number of caudals (female *peruviana* maximum is 50; female *tarmensis* 55), and a complete loss of the marked *peruviana* dorsal color pattern so that the snake is a uniform light greyish brown above (cf. figs. 5 & 7, 10 & 11). It is possible that *tarmensis* is a race of *peruviana*, but this can not be decided until more material becomes available.

Despite the differences mentioned above, *affinis*, *peruviana*, and *tarmensis* have certain features in common as mentioned in the introduction so they have been placed into one complex. Two entirely separate side lines have evolved from *peruviana* in the center of this complex — *attenuata* at the edge of the eastern tropical lowlands, and *chilensis* along the coast of Chile.

T. attenuata appears to have arisen from certain populations of *peruviana* which migrated to the edge of the tropical lowlands and became somewhat adapted to the changing conditions by elongating slightly. As mentioned in the introduction, the elongation of the body caused an increase in the number of caudals and total ventrals, and in the ratio of tail length to total length. The separation was made more complete by a change in the penial characters, and an increase in the number of solid maxillary teeth. This has been pointed out above. The color pattern of the ancestral *peruviana* remained to a great extent. *T. attenuata* is now found along the edge of the tropical lowlands of southern Peru and northern Bolivia. There was probably only one uniform species at first, but during the course of time the Peruvian and Bolivian populations have diverged a bit in their color patterns. *T.a.attenuata* in Peru masked the typical dorsal pattern by the development of a profuse black flaking on the back, while in *a. boliviana* the rows of dorsal black spots fused at their corners to give a checkered effect (cf. figs. 5–7 & 13–16). Minor differences in the number of teeth and number of abdominals and caudals also appeared.

One paradox presents itself in connection with this theory of the evolution of *attenuata*. That is, if *attenuata* arose from certain *peruviana*

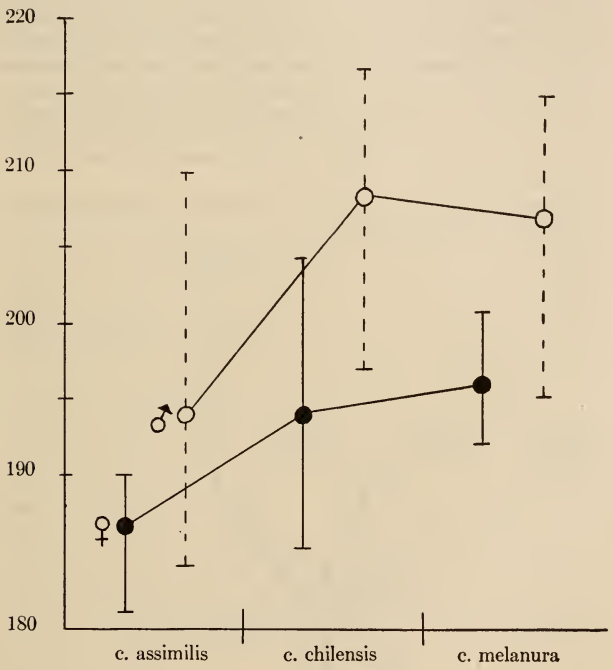
populations when they migrated down to the edge of the eastern tropical lowlands, how is it that other populations have reached quite low elevations in this region without changing significantly? For example, both forms have been taken in the Peruvian department of Madre de Dios. In Bolivia *peruviana* has been taken at the city of Santa Cruz (c. 500 meters), and *attenuata* in the department of Cochabamba at an elevation of 2,500 meters! The problem can not be definitely answered without a better idea of the environment in which the specimens were taken, but it can be pointed out that there are mountains in parts of Madre de Dios, that the tropical lowlands reach a high elevation in Cochabamba[1], and that Santa Cruz, despite its low elevation, is adjacent not only to the Amazonian forests but also to a grazing and agricultural region. Thus the above concept of the evolution of *attenuata* along the edge of the tropical lowlands of the Amazon Basin is not necessarily thrown out despite a conflict in elevations.

T. chilensis, the second marked sideline arising from *peruviana* stock, evolved when that form spread down the western side of the Andes to the coast of Chile. This sideline also became distinct from *peruviana* in such features as penial characters, oculars, labials, and coloration as pointed out in the introduction. As mentioned, the penis resembles that of *attenuata*, but this must represent a case of parallel evolution since the two are completely isolated from one another by the Andes. The southward migration of *Tachymenis* into Chile must have taken place some time ago when conditions in northern Chile were not so extremely arid. Subsequently a hiatus appears to have developed in this region. At least no specimens have been obtained there, but more collecting is necessary to be certain.

As *chilensis* spread southward along the coast, three races appeared more or less in north-south sequence. These differ from one another in the number of abdominals and caudals, and in coloration. The number of abdominals and caudals increases from north to central Chile, and then falls off a bit in certain parts of the south. This cline shows up best in the number of total ventrals as diagrammed on page 41. The color difference is even more marked, and striking evolutionary tendencies can be seen (figs. 20–22). *T.c.assimilis*, the most northern race, typically has a pattern which approaches that of *peruviana*. Both forms have a narrow light middorsal line or row of small spots which is bordered by a row of very obvious large black spots. Laterally, on the fourth scale row, each has a series of smaller dark spots which

[1] Maps of the American Geographic Society show "Las Yungas" reaching an elevation of at least 3,000 meters in Cochabamba.

is tending to fuse into a line (cf. figs. 6 & 7 with 20). *T.c.assimilis* differs in that the rows of dorsal spots fuse into lines posteriorly. Thus *assimilis* has the spotted appearance of *peruviana* anteriorly, while posteriorly the pattern is more lineate.

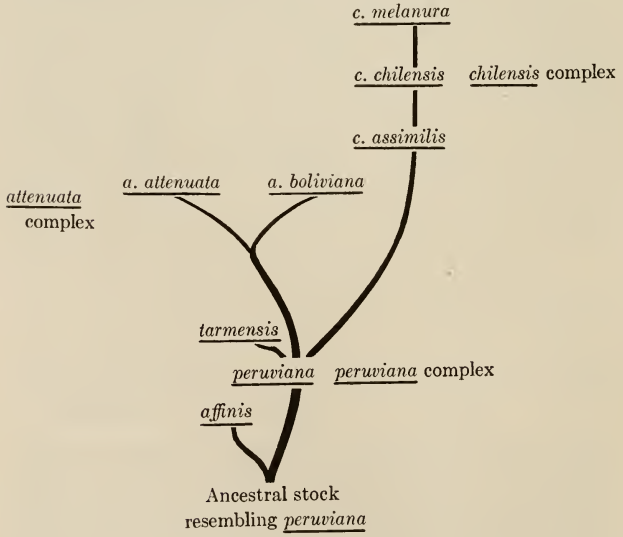


In *c. chilensis,* this tendency is carried a step further. The light middorsal line is very pronounced, the large bordering black spots are reduced to very small ones which fuse into a very narrow line for the entire length of the animal, and the lateral line is accentuated by a lightening of the ground color above it (fig. 21). Thus *c. chilensis* has a conspicuous lineate pattern quite distinct from the spotted one of *peruviana* but easily derived from it. In fact there is a bit of ontogene-

tic recapitulation, for the young of *c. chilensis* tend to be more spotted than the adults.

T.c.melanura is the most recent race. It has evolved from *c. chilensis* by developing a great deal of dark pigmentation. This tends to obscure the typical *c.chilensis* pattern, but traces of it can be seen in the adults (fig. 22). The young, judging from a late embryo, have lost all trace of a spotted pattern and merely recapitulate the adult pattern of *c. chilensis*. At present *melanura* is a local race known only from the vicinity of Mafil in Valdivia. Typical *chilensis* is found to the north and south of it. The climate of this region is marine, and the recently evolved *melanura* would appear to be better suited for such conditions. If so, *melanura* would be expected to gradually replace *chilensis* in the forested south.

By way of summarizing the above relationships, a tentative phylogenetic tree is presented below:



Tachymenis migrated from Peru and Bolivia down the west side of the Andes to the coast of Chile, and here gave rise to *chilensis*. It is

absent in the higher mountains of Chile, but this is not surprising when one considers the ruggedness and severity of climatic conditions in the higher parts of the Chilean Andes. But one problem remains. Why has there not been a similar migration down the east side of the mountains into Argentina? The scrub woodlands and grass steppes of the region should be ideal for *Tachymenis*, yet it is conspicuous by its absence.[1] There is the possibility of course that more collecting would reveal its presence. A real absence would be hard to explain unless in terms of lack of time, or occupation of its ecological niche by other forms. More field work is necessary.

Outlying Species

All the snakes discussed above form a natural phylogenetic unit. But in addition to these forms centering around *peruviana*, three other species have been added to the genus since Boulenger and others limited it to include only *peruviana* and its allies. These are *elongata* Despax (1910) from Tablazo de Paita, Peru; *brasiliensis* Gomes (1918) from Pindamonhangaba in the State of Sao Paulo, Brazil; and *surinamensis* Dunn (1922) from Surinam. Their relationship to *peruviana* and allies is a problem because of certain morphological differences and their outlying geographic position. Perhaps they spread peripherally from the Andes at some distant time, and a large hiatus has since developed; perhaps they and *peruviana* had some common lowland ancestor, or perhaps they have been misassigned to *Tachymenis*. Dunn (1922) says of *surinamensis*, "I am in some doubt as to whether the generic assignment of this snake is correct. . . . It is evidently closely allied to *Tachymenis elongata*." Morphological characters should eventually throw some light upon this problem, but the status of these snakes must remain questionable until their anatomy and range is better known. A reexamination of the types and accumulation of more material is necessary. Existing descriptions omit certain important features such as dentition, body proportions, penial characters, etc.

[1] Amaral (1930) gives the range of *peruviana* (of Boulenger) as including Argentina and Paraguay, but I have not found any specific records in the literature of its occurrence there. Specimens in the material I have examined from Argentina which were said to be *Tachymenis* have proved to be *Dryophaylax*. Other reports in the literature of the occurrence of *peruviana* in such places as Ecuador have also resulted from misidentification.

Redefinition of *Tachymenis:* Synonymy, Morphological Characters, Range, Habits

Genus Tachymenis

1835 *Tachymenis* Wiegmann, N. Acta. Ac. Leop.-Carol., **17**, p. 252, pl. 20, fig. 1 (type *peruviana*).
1837 *Coronella* Schlegel (not of Laurenti), Phys. Serp., **2**, p. 70, (part).
1843 *Ophis* Fitzinger (not of Wagler), Syst. Rept., pt. 1, p. 28, (part).
1854 *Dipsas* Duméril and Bibron (not of Laurenti), Erpét. Gén., **7**, p. 1159, (part).
1863 *Mesotes* Jan, Arch. Zool. Anat. Fisiol., **2**, p. 308, (part).
1863 *Psammophylax* Jan (not of Fitzinger), Arch. Zool. Anat. Fisiol., **2**, p. 311, (part).
1915 *Leimadophis* Barbour (not of Fitzinger), Proc. Biol. Soc. Washington, **28**, p. 149.

Since *peruviana* is the type of *Tachymenis*, *peruviana* and its immediate allies form the nucleus of the genus. It may be that they constitute a subgenus or perhaps the entire genus. Consequently a knowledge of the questionable outlying forms is not absolutely necessary for an understanding of the characters which must be used to define the genus. It can be described in terms of the least common denominators of *affinis, peruviana, tarmensis, attenuata, and chilensis.*[1]

All are snakes of moderate size. The largest individuals are only about 26 inches long. The ratio of tail length to total length is between 0.14–0.18 in the females of most of the forms, and 0.15–0.21 in most males. Some forms, however, have a relatively longer tail so the ratio is increased to 0.23 in females and to 0.24 in males. The body proportions of most of the snakes are moderately stocky. A few forms are a bit more elongate. An oval shaped head is only slightly distinct from the neck. The body of all is more or less cylindrical in section. The eye is of moderate size with a subeliptical shaped pupil.

Their hemipenis is bifurcate, although not deeply so, with a bifurcate ductus spermaticus. The tip is spinose becoming calyculate in some. The body is spinose in all, but the length and distribution of these spines vary from species to species. The base of all forms bears a few

[1] In discussing the range of variation of such quantitative characters as number of teeth and scales, I have only used my observations and those of the original authors in the type descriptions. The slight extensions of this variation which have been reported in the literature have already been discussed and they are not repeated here because I have often found them to be unreliable.

scattered minute spines. Some have several very large basal spines as well.

The solid maxillary teeth are subequal or increase a bit in length posteriorly. Their number ranges from 5–16. These are followed after a gap by a pair of large, distinctly grooved fangs. The first few mandibular teeth are quite small, but the length increases rapidly, reaches a maximum in the front of the jaw, and then decreases gradually.

All the typical cephalic plates are present. In all, the rostral is broader than deep, slightly visible from above; internasals a bit shorter than the prefrontals; frontal 1⅓ to 2 times as long as broad, longer than its distance from the end of the snout, as long as or shorter than the parietals; supraocular of normal size; nasal generally entire, occasionally semidivided; preoculars 1 or 2, rarely 3, the top preocular reaching the top of the head but not contacting the frontal; postoculars typically 2, rarely 1 or 3; temporals usually 2–2 or 2–3 but many variations are common; supralabials either 7(3–4) or 8(4–5), departures from these are rare; infralabials variable but generally 9(4) or 9(5); anterior pair of chin shields as long as or longer than the posterior.

The dorsal scales are smooth and generally have a single apical pit, although this is poorly developed in some and completely absent in other forms. One individual had indications of two pits. The scales are arranged in an odd number of parallel rows with a reduction pattern of 19–19–15 or 17–17–15. Only a small amount of variation is encountered in the number of cervical or preanal rows.

The abdominals are rounded and not extremely numerous. The female range is 134–158; males 136–169. The anal is divided except in a few aberrant individuals. The caudals are paired in most, but some have a few entire ones. The female range is 37–65; male 40–69. The total ventral range in females is 176–221; males 184–221.

The color pattern in these snakes is quite diverse, but some common features can be seen. In the basic pattern, there is a small dark streak extending from the snout through the eye to the angle of the mouth. A similar streak runs from the parietals to the angle of the jaw. The labials are variably marked with black. Most specimens have such a mark under each eye. There is a light line or series of spots on the middle of the back. This is bordered on each side by a series of dark spots which often fuse into a stripe or line. There is a similar lateral

series of spots or line on the fourth row of scales. Most of the dorsal scales in the majority of forms have a dark apical dot about the size of and in the position of the apical pit. There is a large number of irregular dark markings ventrally which may be arranged in a linear manner. This pattern is quite fundamental and appears in practically all the forms of *Tachymenis*. In a couple of forms it is masked by a secondary black flaking or melanism but traces of the fundamental pattern can be seen even in these. The pattern is, however, completely lost in *tarmensis*. The spotted pattern is more primitive than the lineate, for it is found in the adults which are believed to be closest to the ancestral type, and in the young of certain of the lineate forms. The most advanced types such as *chilensis melanura* have lost all trace of it — even the young are lineate.

Sexual dimorphism is manifest in the genus in terms of the number of abdominals and caudals. Oddly enough, the males have a greater number of abdominals as well as caudals. Consequently there is only a slight overlap between the number of male and female total ventrals. This tendency could be seen to a degree in all the forms studied if both sexes were available. However, it is most apparent in analyses of single populations. The specimens of *peruviana* from Huanta illustrate this point very well. Their counts are summarized below in tabular form:

	abdominal range	average	caudal range	average	total ventral range	average
6 females	146–150	148	41–47	44	187–196	191
6 males	148–156	152	49–52	51	200–206	202

The above tendencies are also reflected in the ratio of tail length to total length which is a bit higher in the males, and in the slightly greater male size. Sexual dimorphism could not be detected in other characters.

The genus seems to center in the Andes of the southern half of Peru and northern Bolivia. It reaches elevations there as high as 4,000

meters, but is most abundant in the region of grassy steppes at elevations which are a bit lower. It has extended from the central Andes to some of the lower valleys on both sides of the mountains. It has even reached the edge of the tropical lowlands of the Amazon basin, but has not spread very widely there. It has also spread down the west side of the Andes to the coast of Chile. It is found at lower elevations in Chile presumably because of the unfavorable nature of the higher mountains. Members of the genus are absent in the severe deserts of northern Chile, but do occur in the semiarid regions. They are probably found in the valley bottoms in such places where there would be some vegetation for cover. The snakes are very abundant in the mediterranean portion of central Chile where they constitute one of the commonest species. They have extended south from here into the forested and lake region of Chile but have not been taken below Puerto Montt. The genus apparently has not migrated down the east side of the Andes to the plains of Argentina.

Notes on the Habits of the Various Forms

Since field notes have seldom been taken, little direct information is available on the habits of *Tachymenis*. Nevertheless it is possible to make a few deductions on the basis of habitat and morphology. In as much as the members of the *peruviana* and *chilensis* complexes are fairly stocky snakes, and the bulk of the specimens have come from alpine, semiarid, or mediterranean regions, they must be terrestrial. Those from southern Chile were taken in forested country, but even these have the body form of a terrestrial snake. The Montana and Yungas range of members of the *attenuata* complex, together with the more elongate body form suggests the possibility that the terrestrial life is supplemented by a semiarborial habit in these forms.

The subeliptical shaped pupil of all of these snakes may indicate that they are most active at night in their search for food, etc. Examination of the stomach contents of ten specimens that had obviously eaten recently revealed that their diet consists primarily of small frogs, but occasionally toads and terrestrial lizards are captured. Their rear fanged poison apparatus would help to subdue the more active

prey. The stomach contents of the specimens examined is tabulated below:

Species	Specimen	Locality	Stomach Contents[1]
T.p. peruviana	M.C.Z. 45916	Yanama, Junin, Peru	Remains of a frog
T.p. peruviana	C.M.N.H. 39647	Huanta, Ayacucho, Peru	*Bufo spinulosus trifolium* Tschudi
T.p. peruviana	C.M.N.H. 34086	Juliaca, Puno, Peru	*Liolaemus multiformis multiformis* (Cope)
T. attenuata boliviana	A.M.N.H. 36017	Incachaca, Cochabamba, Bolivia	Remains of a frog and lizard
T.c. chilensis	C.M.N.H. 40117	Valparaiso, Aconcagua, Chile	*Eupsophus taeniatus* (Girard)
T.c. chilensis	A.M.N.H. 18328	Coracol, Concepcion, Chile	*Eupsophus taeniatus* (Girard)
T.c. chilensis	C.M.N.H. 6221	Curacautin, Cautin, Chile	*Pleurodema bibroni* Tschudi
T.c. chilensis	C.M.N.H. 31617	Traiguen, Cautin, Chile	*Liolaemus pictus pictus* (Duméril and Bibron)?
T.c. melanura	C.M.N.H. 3867	Mafil, Valdivia, Chile	Remains of a frog
T.c. melanura	C.M.N.H. 3875	Mafil, Valdivia, Chile	*Eupsophus taeniatus* (Girard)

[1] I am indebted to Mr. B. Shreve for the identification of certain of the stomach content specimens.

No information is available on the reproduction of *attenuata* or *affinis,* but examination of the oviducts of adult females[1] of *peruviana* and *chilensis* show that these forms are ovoviviparous and give birth to from three to fourteen[2] young. Fertilization takes place in *peruviana* about May and the young are born in September. The material on *chilensis* is not as conclusive, but seems to indicate that the reproductive cycle extends from November to February or perhaps even later. The data is tabulated below:

Tachymenis peruviana:

Date		*Specimen*	*Locality*	*Condition of the Embryo*
January		.....		
February		.....		
March		C.M.N.H. 39650	Haunta, Ayachucho, Peru	Oviducts empty
		M.C.Z. 42435	Pachacayo, Junin, Peru	Oviducts empty
April		.....		
May		M.C.Z. 45914	Yauyos, Lima, Peru	4 eggs present; embryo not visible grossly
"	1	C.M.N.H. 40179	Yunguyo, Puno, Peru	10 eggs present; embryo not visible grossly
"	1	C.M.N.H. 40181	Yunguyo, Puno, Peru	5 eggs present; embryo not visible grossly
"	1	C.M.N.H. 40190	Yunguyo, Puno, Peru	5 eggs present; embryo not visible grossly
"	19	C.M.N.H. 5698	Tarma, Junin, Peru	Oviducts empty

[1] All adult females with a known collecting date were examined by palpation for eggs. The pregnant ones were opened, and one or more of the embryos studied.

[2] Fourteen eggs were counted by palpation in U.S.N.M. 56442. This specimen is from Chile but since no further data is available, it has not been included in the accompanying tables.

Tachymenis peruviana:

Date	*Specimen*	*Locality*	*Condition of the Embryo*
June	.....		
July	.....		
August 29	C.M.N.H. 40212	Pisacoma, Puno, Peru	6 eggs present; immature embryo; coiled length 15 mm.
September 14	C.M.N.H. 34156	Collacachi, Puno, Peru	6 eggs present; immature embryo; coiled length 8 mm.
" 14	C.M.N.H. 34160	Collacachi, Puno, Peru	8 eggs present; immature embryo; coiled length 12 mm.
" 16	C.M.N.H. 34105	Urco, Cusco, Peru	Oviducts empty
" 16	C.M.N.H. 34107	Urco, Cusco, Peru	3 eggs present; immature embryo; coiled length 10 mm.
" 19	C.M.N.H. 34086	Juliaca, Puno, Peru	Oviducts empty
" 19	C.M.N.H. 34131	Urco, Cusco, Peru	3 eggs present; mature embryo; coiled length 32 mm., uncoiled 108 mm.
" 19	C.M.N.H. 34132	Urco, Cusco, Peru	8 eggs present; immature embryo; coiled length 17 mm.
October	.....		
November	.....		
December	.....		

Tachymenis chilensis:

Date	*Specimen*	*Locality*	*Condition of the Embryo*
January	.....		
February 14 to 28	C.M.N.H. 3868	Mafil, Valdivia, Chile	7 eggs present; embryo not visible grossly
	C.M.N.H. 3872	Mafil, Valdivia, Chile	Oviducts empty
	C.M.N.H. 3876	Mafil, Valdivia, Chile	Oviducts empty
	C.M.N.H. 3878	Mafil, Valdivia, Chile	4 eggs present; mature embryo; coiled length 21 mm., uncoiled 98 mm.
	C.M.N.H. 3879	Mafil, Valdivia, Chile	Oviducts empty
	C.M.N.H. 3883	Mafil, Valdivia, Chile	Oviducts empty
March 26	C.M.N.H. 40117	Valparaiso, Aconcagua, Chile	Oviducts empty
March 26 to April 20	C.M.N.H. 3863	Concepcion, Concepcion, Chile	Oviducts empty
May	C.M.N.H. 23808	Chiquahue, Bio Bio, Chile	Oviducts empty
June	.....		
July	.....		
August 9 to 16	C.M.N.H. 5771	Domeyko, Atacama, Chile	
September	.....		
October	.....		
November	C.M.N.H. 31617	Traiguen, Cautin, Chile	8 eggs present; embryo not visible grossly
December	.....		

It is noteworthy that *peruviana*, although occurring a bit south of the equator, has the reproductive cycle characteristic of snakes of the northern hemisphere. This is not too surprising when it is realized that its remote ancestors probably came from the north, and that the seasonal differences near the equator are not pronounced enough to require a change. However, the breeding period of *chilensis*, or at least the southern members of the species, has shifted to conform to the summer season in southern South America. It would be of interest to know whether this change has become a specific difference, or whether it is limited to the southern populations of *chilensis*. This cannot be decided until more material becomes available from northern Chile.

Key to Tachymenis peruviana *and Allies*

As pointed out above, *Tachymenis peruviana* and its immediate allies form at least the nucleus of the genus. A key to their identification follows:

1 Body form moderately stocky. Correlated with this, the caudals are under 60 and the ratio of tail length to total length is under 0.22. Solid maxillary teeth 6–12 2

1[1] Body form elongate. Correlated with this, the caudals are 60 or over and the ratio of tail length to total length is 0.22 or over. Solid maxillary teeth 12–16. Found in southeastern Peru or eastern Bolivia along the edge of the tropical lowlands ..... The *attenuata* complex. 5

2 (1) Supralabials 8(4–5); preocular 1; body of hemipenis covered with spines of subequal size, no large basal spines. Found in the Andean region of Peru and Bolivia ..... The *peruviana* complex. 3

2[1] Supralabials 7(3–4); preoculars 2; body of the hemipenis covered with spines which increase in size posteriorly, several large basal spines. Found along the coast of Chile ..... The *chilensis* complex. 6

3 (2) Midbody scale rows 19 4

3[1] Midbody scale rows 17. Found in the Andean region of Central and Southern Peru ..... *affinis*

4 (3) Dorsal scales with single apical pits although these are sometimes poorly developed, a well developed spotted dorsal ground color, female caudals 50 or under, 6–10 solid maxillary teeth. Found in the Andean region of central and southern Peru ..... *peruviana*

4[1] Dorsal scales without apical pits, dorsal color a uniform grayish brown with no trace or only a very slight trace of darker spots, female caudals over 50, 12 solid maxillary teeth. Found in or near Tarma, Department of Junin, central Peru..... *tarmensis*

5 (1[1]) Dorsal scales generally heavily flaked with black, obscuring any other pattern; 12–14 solid maxillary teeth. Found in southeastern Peru..... *attenuata attenuata*

5[1] A checkered dorsal color pattern, 14–16 solid maxillary teeth. Found in eastern Bolivia..... *attenuata boliviana*

6 (2[1]) A distinctly spotted or lineate dorsal color pattern.....7

6[1] Dorsal ground color so melanistic that an underlying lineate pattern is nearly completely obscured. Found in or near Mafil, Province of Valdivia, southern Chile..... *chilensis melanura*

7 (6) The rows of dorsal spots on either side of the light middorsal line are very prominent being two or more scales wide. The spots fuse into a stripe posteriorly, but are usually distinct anteriorly. Found in northern Chile from the province of Atacma to the province of Santiago..... *chilensis assimilis*

7[1] The rows of dark dorsal spots are much reduced in size and fuse to form a line. They are not over one scale wide. Found in central and southern Chile from the province of Aconcagua to the province of Chiloe..... *chilensis chilensis*

Relationship between *Tachymenis* and other Boiginae

I conclude this discussion of *Tachymenis* by emphasizing how little we know about its relation to other genera of Boiginae in South America. At one time there was confusion between *Tachymenis* and *Erythrolamprus*. Boulenger and others decided that many species originally described as *Tachymenis* were misassigned and that they should be referred to *Erythrolamprus*. A list of these can be found in the introduction. Boulenger pointed out in his *Catalogue* (1896) that members of *Eryth*olamprus differ in having fangs which are only feebly enlarged and sometimes not grooved, a round pupil, no scale pits, a variable number of scale rows (15, 17, 19, 21, or 23), and ventrals which are sometimes obtusely angulate laterally. These criteria should separate the two genera, but the situation has become confused because it has been realized that *Erythrolamprus* as redefined by Boulenger is an *omnium gatherum*. Among other things, it included all of *Coniophanes* (Cope, 1860) which has since been removed from the synonymy. Dunn (1922) feels that *Coniophanes* is very close to *Tachymenis*, and perhaps inseparable. *Tachymenis* is the older name.

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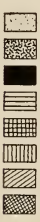
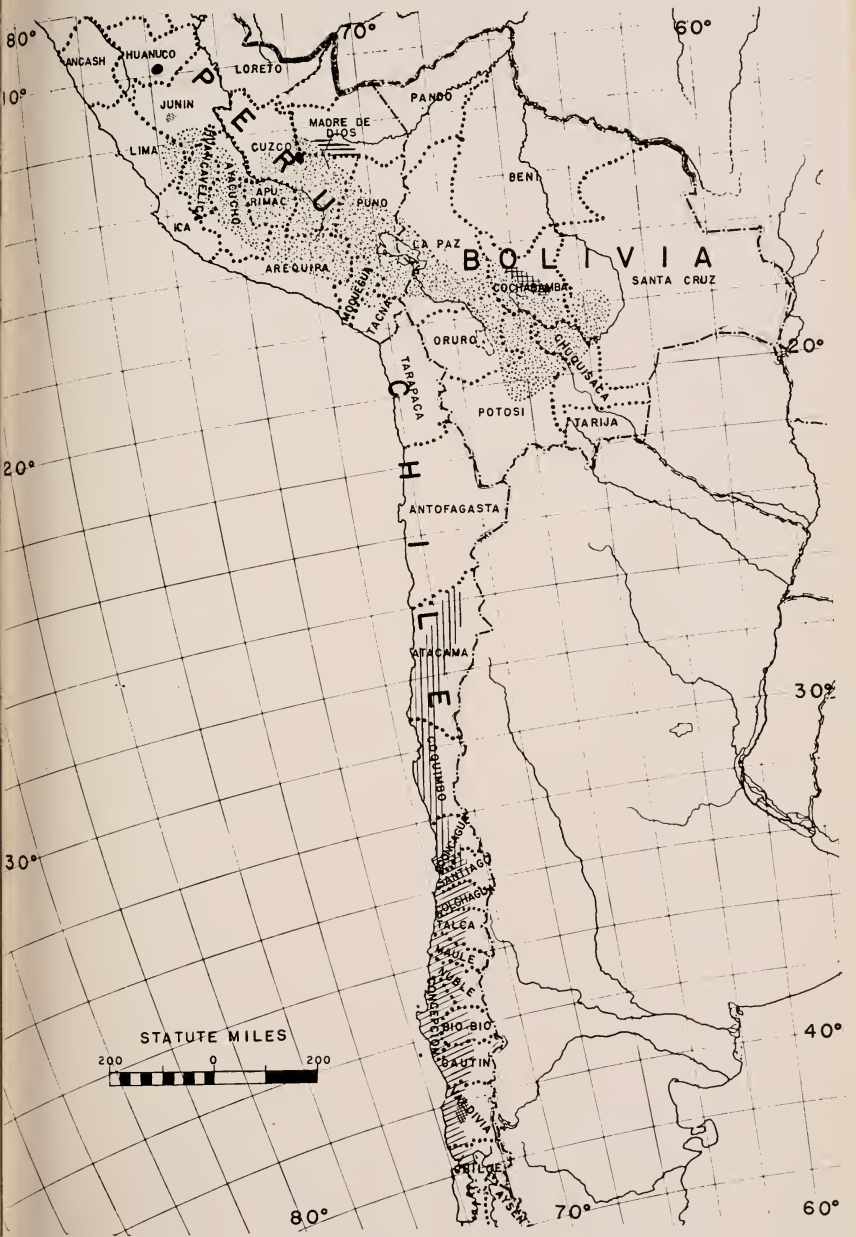
PLATES

PLATE 1

Fig. 1. Map of southwestern South America showing the approximate range of the species of *Tachymenis* studied above. The outline for this map was obtained through the courtesy of the American Geographical Society. The key to the map follows. The range of *T. tarmensis* is in central Junin only. Its symbol may not be clear.



Tachymenis peruviana Wiegmann
Tachymenis tarmensis Walker.
Tachymenis affinis Boulenger
Tachymenis attenuata attenuata Walker
Tachymenis attenuata boliviana Walker
Tachymenis chilensis assimilis (Jan)
Tachymenis chilensis chilensis (Schlegel)
Tachymenis chilensis melanura Walker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10°
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ANCASH
HUANUCO
LORETO
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MADRE DE DIOS
LIMA
CUZCO
HUANCAVELICA
AYACUCHO
APURIMAC
PUNO
BENI
ICA
LA PAZ
BOLIVIA
AREQUIPA
MOQUEGUA
TACNA
COCHABAMBA
SANTA CRUZ
ORURO
CHUQUISACA
TARAPACA
POTOSI
TARIJA
ANTOFAGASTA
CHILE
ATACAMA
COQUIMBO
ACONCAGUA
SANTIAGO
O'HIGGINS
TALCA
MAULE
ÑUBLE
CONCEPCION
BIO-BIO
CAUTIN
MALLECO
ARAUCO
STATUTE MILES
200
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200

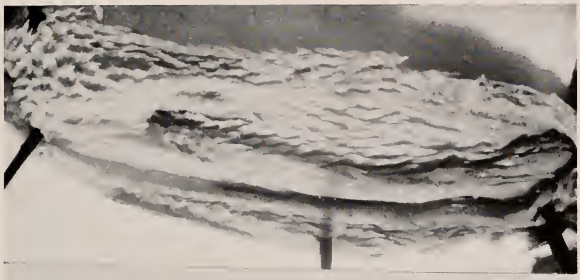
PLATE 2

PLATE 2

Fig. 2. *Tachymenis peruviana* Wiegmann. Dissection of the hemipenis of a specimen from Vitor, Arequipa, Peru (C.M.N.H. 34260). x5.

Fig. 3. *Tachymenis attenuata attenuata* Walker. Dissection of the hemipenis of the type from the department of Madre de Dios, Peru (C.M.N.H. 40071). x4.

Fig. 4. *Tachymenis chilensis chilensis* (Schlegel). Dissection of the hemipenis of a specimen from Concepcion, Concepcion, Chile (M.C.Z. 16374). x3.



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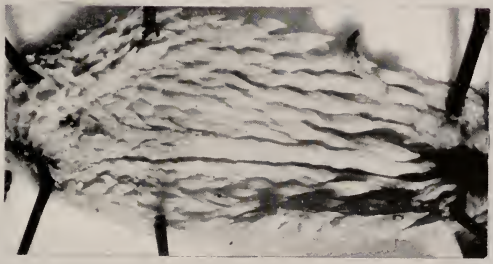

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PLATE 3

PLATE 3

Fig. 5. *Tachymenis peruviana* Wiegmann. Lateral view of the head and neck of a specimen from Huacullani, Puno, Peru (C.M.N.H. 40213) showing typical coloration. x1½.

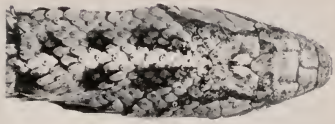
Fig. 6. Same specimen as in figure 5. Dorsal view of the head and neck. x1½.

Fig. 7. *Tachymenis peruviana* Wiegmann. Typical dorsal coloration as seen in a specimen from Yunguyo, Puno, Peru (C.M.N.H. 40181). x¾.

Fig. 8. *Tachymenis peruviana* Wiegmann. Dorsal pattern of a specimen from Santa Cruz de la Sierra, Santa Cruz, Bolivia (A.M.N.H. 8793) showing fusion of the light middorsal spots into a distinct line. This may be the pattern of *dorsalis* Werner, 1901. Natural size.

Fig. 9. *Tachymenis peruviana* Wiegmann. Dorsal pattern of a specimen from the department of Madre de Dios, Peru (C.M.N.H. 40075). The row of light middorsal spots is still in evidence, even though the specimen is very melanistic. x¾.

5



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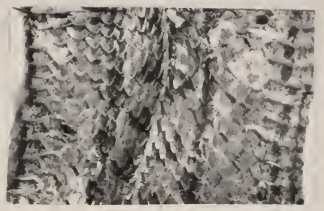

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PLATE 4

PLATE 4

Fig. 10. *Tachymenis tarmensis* Walker. Lateral view of the head of the type specimen from Tarma, Junin, Peru (C.M.N.H. 5698). Notice the loss of the typical *peruviana* pattern. x1½.

Fig. 11. Same specimen as in figure 10. A strip of skin from the back showing the absence of any pattern. x¾.

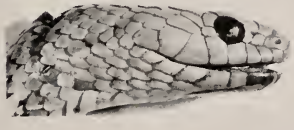
Fig. 12. *Tachymenis affinis* Boulenger. A strip of skin from the middle of the back of a specimen from Macchu Picchu, Cuzco, Peru (U.S.N.M. 60721) showing reduction of color pattern. x¾.

Fig. 13. *Tachymenis attenuata attenuata* Walker. Lateral view of the head and neck of the type from the department of Madre de Dios, Peru (C.M.N.H. 40071). x1½.

Fig. 14. Same specimen as in figure 13. Dorsal view of the head and neck. x1½.

Fig. 15. Same specimen as in figure 13. Dorsal pattern. x¾.

Fig. 16. *Tachymenis attenuata boliviana* Walker. Dorsal pattern of the type from Incachaca, Cochabamba, Bolivia (A.M.N.H. 36020). Natural size.



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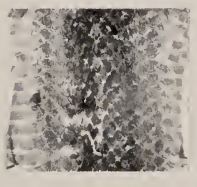

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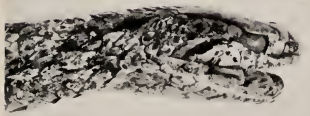

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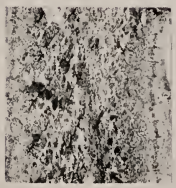

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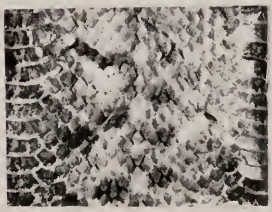

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PLATE 5

PLATE 5

Fig. 17. *Tachymenis chilensis chilensis* (Schlegel). Typical dorsal pattern as seen in a specimen from Talcaguano, Concepcion, Chile (M.C.Z. 2540). x¾.

Fig. 18. *Tachymenis chilensis chilensis* (Schlegel). Dorsal pattern of another specimen from Talcaguano, Concepcion, Chile (M.C.Z. 2066) showing a great accentuation of the typical lineate pattern. x¾.

Fig. 19. *Tachymenis chilensis chilensis* (Schlegel). Dorsal pattern in a specimen from Concepcion, Concepcion, Chile (M.C.Z. 16374) showing a reduction of the typical lineate pattern. x¾.

Fig. 20. *Tachymenis chilensis assimilis* (Jan). Dorsal view of the anterior part of a specimen from Valparaiso, Aconcagua, Chile (A.M.N.H. 36147) showing the large series of dorsal spots beginning to merge into stripes. x¾.

Fig. 21. *Tachymenis chilensis chilensis* (Schlegel). Dorsal view of the anterior part of a specimen from Talcaguano, Concepcion, Chile (M.C.Z. 2540) showing typical pattern of small dorsal black spots merging into a line. x¾.

Fig. 22. *Tachymenis chilensis melanura* Walker. Dorsal view of the anterior part of the body of a paratype from Mafil, Valdivia, Chile (C.M.N.H. 3883) showing a slight retention of the typical *chilensis* pattern, despite the melanistic nature of the race. x¾.

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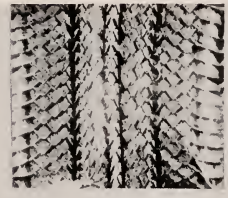

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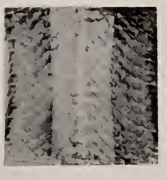

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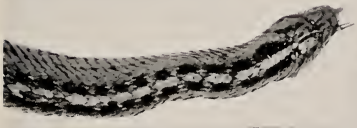

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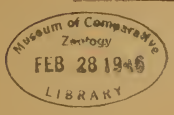

FIRST SUPPLEMENT TO TYPICAL REPTILES AND AMPHIBIANS

By THOMAS BARBOUR and ARTHUR LOVERIDGE

CAMBRIDGE, MASS. U. S. A.
PRINTED FOR THE MUSEUM
FEBRUARY, 1946

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No. 2—*First Supplement to Typical Reptiles and Amphibians*

By Thomas Barbour and Arthur Loveridge

In June 1929, under the title: "Typical Reptiles and Amphibians," we published (Bull. Mus. Comp. Zoöl., **69**, pp. 205–360) a list of the 1473 lots of type material in the Herpetological Collections of the Museum of Comparative Zoölogy. During the 16 years which have since elapsed, type material of a further 795 species has been added, and it was considered advisable to prepare a list of them in connection with their possible removal to a place of greater safety than the Museum itself. The opportunity, therefore, has been taken to prepare this supplementary list which reveals that type material continues to accumulate at the rate of rather less than a species each week. This, of course, is not expected long to continue.

There appears to be some confusion among certain former European correspondents as to the precise meaning of the various terms employed. Thus one author (Ernst Ahl) frequently and stupidly designated examples of a new species from one locality as "Types," while material from other places he called "Cotypes." The late Franz Werner, who should have known better, sometimes sent us specimens labelled "Type" which, on investigation, proved to be only topotypes (*i.e.* from the type locality but not available to the describer at the time when he proposed the new race or species). It is, therefore, advisable to define the three terms employed in the present paper.

Holotype. The designated single specimen on which the original description was based. For the purposes of this list, however, the term has been used also for those cases where there was no second individual available to the describer.

Cotype. One of several specimens utilized by the describer in preparing his description, yet for which he failed to designate a specific individual as type.

Paratype. An individual used or mentioned by the author when publishing the original description in which he clearly designates one particular specimen as "Type."

Type. Actually synonymous with Holotype, but in this paper used to indicate those species where other specimens (paratypes) were mentioned by the describer.

In conformity with Article 32 of the International Rules of Zoological Nomenclature, we place the name of an author in parentheses only

when a taxonomic change involves the transference of the species named by him to a different genus than that to which he originally assigned it.

The first column contains the Registration Number in the Museum of Comparative Zoölogy, where two parallel series of numbers have always been employed for reptiles and amphibians. The third column contains the full name of the collector, where known, initials being omitted where the specimen is accredited to more than one collector. The fourth column records the source—usually the donor, or the museum from which the specimen was received in exchange. In this connection we take the opportunity of expressing our deep appreciation to the Curators of the United States National Museum, the Museum of Zoölogy, University of Michigan, and the Chicago Natural History Museum, for their helpful coöperation in effecting extensive exchanges of paratype material to the mutual enrichment of our respective collections. We wish to urge upon our colleagues abroad that they propose further exchanges so that type material may be widely disseminated and less subject to total loss than if the entire series is hoarded in one institution. The last column is reserved for the date received, not infrequently prior to 1929 in which case it will generally be found that the species, or race, was only recognized and diagnosed subsequent to the publication of our last list.

For the convenience of workers on restricted taxonomic groups, the figures furnished below show the numbers of species accredited to the various groupings listed.

AGAMIDAE	16	GERRHOSAURIDAE	1
AMPHISBAENIDAE	3	GEKKONIDAE	84
ANGUIDAE	6	HYLIDAE	33
BOIDAE	15	IGUANIDAE	60
BRACHYCEPHALIDAE	6	LACERTIDAE	22
BREVICIPITIDAE	9	LEPTODACTYLIDAE	61
BUFONIDAE	23	LEPTOTYPHLOPIDAE	7
CAECILIIDAE	8	PIPIDAE	44
CAUDATA	51	POLYPEDATIDAE	53
CHAMAELEONIDAE	7	RANIDAE	39
CHELONIA	22	SCINCIDAE	54
COLUBRIDAE	106	TEIIDAE	28
CORDYLIDAE	11	TYPHLOPIDAE	14
CROCODYLIDAE	1	VARANIDAE	1
CROTALIDAE	10	VIPERIDAE	2
ELAPIDAE	15	XANTUSIIDAE	1

The senior author appreciates the courtesy of his junior colleague in adding his name to the title. He is just selfish enough to allow it to remain for purely sentimental reasons.

ABLEPHARUS BOUTONII CAUDATUS Sternfeld

1918, Abhand. Senckenberg. naturf. Ges., **36**, p. 423.

29161. Cotype. Juan de Nova, Mozambique. A. Voeltzkow. Exch. Senckenberg Mus. 1930.

ABLEPHARUS BOUTONII DEGRIJSI (Mertens)
See CRYPTOBLEPHARUS B. DEGRIJSI Mertens

ABLEPHARUS BOUTONII KEIENSIS Roux
See A. B. var. KEIENSIS Roux

ABLEPHARUS BOUTONI var. KEIENSIS Roux=
A. BOUTONII KEIENSIS Roux

1910, Abhand. Senckenberg. naturf. Ges., **33**, p. 240.

29162–3. 2 Cotypes. Elat, Great Kei Id., Molucca Is. Roux & Merton. Exch. Senckenberg Mus. 1929.

ABLEPHARUS BOUTONII MAYOTTENSIS (Mertens)
See CRYPTOBLEPHARUS B. MAYOTTENSIS Mertens

ABLEPHARUS BOUTONII NOVOCALEDONICUS (Mertens)
See CRYPTOBLEPHARUS B. NOVOCALEDONICUS Mertens

ABLEPHARUS BOUTONII RENSCHI (Mertens)
See CRYPTOBLEPHARUS B. RENSCHI Mertens

ABLEPHARUS SMITHII Witte

1936, Revue Zool. Bot. Afr., **4**, p. 29.

42879–80. 2 Paratypes. Nyonga, Lualaba River, Belgian Congo. G. F. de Witte. Exch. Congo Mus. 1937.

ABRANA COTTI Parker=RANA FLOWERI Boulenger

1931, Proc. Zool. Soc. London, 1930, p. 898, fig. 1.

16252. Paratype. Charre, Quilimane, Mozambique. H. B. Cott. Exch. British Mus. 1931.

ACANTHODACTYLUS CANTORIS ARABICUS Boulenger

1918, Bull. Soc. Zoöl. France, p. 154.

28685. Cotype. Aden, Arabia. Exch. British Mus. 1929.

ACANTHODACTYLUS TRISTAMI IRACENSIS Schmidt

1939, Field Mus. Nat. Hist. Zoöl. Ser., **24**, p. 60.

45605. Paratype. Haditha, Iraq. H. Field. Exch. Field Mus. 1940.

ACONTIAS PERCIVALI Loveridge

1935, Bull. Mus. Comp. Zoöl., **79**, p. 13.

31079–80. 2 Paratypes. Voi, Kenya Colony. A. B. Percival. Don. Nairobi Mus. 1930.

40174. Type. Foot of Mt. Mbololo, nr. Voi, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40175–200. 26 Paratypes. Foot of Mt. Mbololo, nr. Voi, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

AGAMA AGAMA DORIAE Boulenger
See A. D. CORDOFANENSIS Werner

AGAMA AGAMA ELGONIS Lönnberg. See A. ELGONIS Lönnberg

AGAMA AGAMA KAIMOSAE Loveridge=
A. PLANICEPS CAUDOSPINOSA Meek

1935, Bull. Mus. Comp. Zoöl., **79**, p. 10.

40136. Type. Rocky Heights 3 miles W. of Kaimosi. Kakamega, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40137–50. 14 Paratypes. Kakamega, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

AGAMA AGAMA TURUENSIS Loveridge=
A. A. ELGONIS Lönnberg

1932, Bull. Mus. Comp. Zoöl., **72**, p. 376.

30686. Type. Unyanganyi, Turu, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30687–735. 50 Paratypes. Unyanganyi, Turu, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

AGAMA AGAMA UFIPAE Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 377.

30741. Type. Kipili, Ufipa, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30742–5. 4 Paratypes. Kipili, Ufipa, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

AGAMA CAUDOSPINOSA Meek = A. PLANICEPS CAUDOSPINOSA Meek

1911, Field Mus. Nat. Hist. Zoöl. Series, **7**, p. 407.

34957. Paratype. Gilgil, Kenya Colony. C. Akeley. Exch. Field Mus. 1933.

AGAMA DORIAE CORDOFANENSIS Werner = AGAMA AGAMA DORIAE Boulenger

1919, Denks. Akad. Wiss. Wien, **96**, p. 42, pl. ii, figs. 1-1a.

15829–30. 2 Cotypes. Falodi, Kordofan, Anglo-Egyptian Sudan. F. Werner. T. Barbour. 1919.

The locality is misprinted "Talodi" in this paper.

AGAMA ELGONIS Lönnberg = AGAMA AGAMA ELGONIS Lönnberg

1922, Ark. Zool., **14**, No. 12, p. 2.

32797. Cotype. East slopes of Mt. Elgon, Kenya Colony. H. Granvik. Exch. Stockholm Mus. 1932.

AGAMA HISPIDA MAKARIKARICA FitzSimons

1932, Ann. Transvaal Mus., **15**, p. 36.

33473–4. 2 Paratypes. Makarikari Pan, Bechuanaland. Vernay & Lang. Exch. Field Mus. 1932.

AGAMA PLANICEPS CAUDOSPINOSA Meek. See A. CAUDOSPINOSA Meek and A. A. KAIMOSAE Loveridge

AGAMA RUEPPELLI SEPTENTRIONALIS Parker

1932, Journ. Linn. Soc. London, Zool., **38**, p. 225.

18280. Paratype. Mbuyuni, Kenya Colony. A. Loveridge. T. Barbour. 1924.

18281. Paratype. Voi, Kenya Colony. A. Loveridge. T. Barbour. 1924.

29640. Paratype. Kenya Colony. E. Heller. Exch. U. S. Nat. Mus. 1930.

Mbuyuni, not Mbunyi, is the correct spelling of one paratype locality.

Agama weidholzi Wettstein

1932, Zool. Anz., p. 303, photo.

44311–2. 2 Paratypes. Tabadienke, etc., Senegambia. A. Weidholz. Exch. Vienna Mus. 1938.

Agkistrodon browni Shreve = Bothrops barbouri (Dunn)

1938, Copeia, p. 9.

42678. Type. Omilteme, Guerrero, Mexico. W. W. Brown. T. Barbour. 1937.

42679. Paratype. Omilteme, Guerrero, Mexico. W. W. Brown. T. Barbour. 1937.

Shreve agrees that this pit-viper is indistinguishable from the snake named *Lachesis barbouri* Dunn, 1919, which some would refer to the genus *Trimeresurus*.

Ahaetulla boiga intermedia Mertens = Dendrophis boiga intermedia (Mertens)

1927, Senckenbergiana, **9**, p. 241.

28602. Paratype. Sumbawa-Besar, Dutch East Indies. R. Mertens. Exch. Senckenberg Mus. 1929.

Allophryne ruthveni Gaige

1926, Occ. Papers Mus. Zool. Univ. Michigan, No. 176, p. 1.

11790. Paratype. Tumatumari, British Guiana. Exch. Michigan Mus 1923.

Alsophis angulifer ruttyi Grant

1940, The Herpetology of the Cayman Islands (Jamaica), p. 50, pl. iii, figs. 5-6.

44876. Type. Little Cayman Id., West Indies. C. Grant. T. Barbour. 1939.

44877-9. 3 Paratypes. Little Cayman Id., West Indies. C. Grant. T. Barbour. 1939.

ALSOPHIS NICHOLSI Grant

1937, Journ. Agric. Univ. Puerto Rico, **21**, p. 516.

46503. Paratype. Buck Id., St. Thomas, U. S. Virgin Is. C. Grant. Exch. Michigan Mus. 1942.

ALSOPHIS VUDII ATERRIMUS Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 362.

37942. Holotype. High Rock, Grand Bahama Id., Bahamas. T. Barbour. T. Barbour. 1934.

ALSOPHIS VUDII PICTICEPS Conant

1937, Proc. New England Zoöl. Club, **16**, p. 82.

43150. Holotype. Bimini Ids., Bahamas. Y. H. Olsen. R. Conant. 1937.

ALSOPHIS VUDII RAINEYI Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 363.

37929. Type. Landrail Point, Crooked Id., Bahamas. T. Barbour. T. Barbour. 1934.

37930–8. 9 Paratypes. Landrail Point, Crooked Id., Bahamas. T. Barbour. T. Barbour. 1934.

ALSOPHIS VUDII UTOWANAE Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 365.

37941. Holotype. Sheep Cay, Great Inagua Id., Bahamas. J. C. Greenway, Jr., T. Barbour. 1934.

AMBYSTOMA TIGRINUM MELANOSTICTUM (Baird)
See AMBYSTOMA TIGRINUM SLATERI Dunn

AMBYSTOMA TIGRINUM SLATERI Dunn = A. T. MELANOSTICTUM (Baird)

1940, Copeia, p. 159.

15819. Paratype. Torrington, Goshen Co., Wyoming. E. M. Schlaikjer. E. M. Schlaikjer. 1930.

24109. Paratype. Alberta, Canada. W. Rowan. W. Rowan. 1939.

The reasons for regarding *slateri* as a synonym of *Siredon lichenoides* var. *melanosticta* Baird were advanced by Bishop (1942, Copeia, p. 256).

AMEIVA BARBOURI Cochran

1928, Proc. Biol. Soc. Washington, **41**, p. 56.

25537. Type. La Source, Gonave Id., Haiti. W. J. Eyerdam. T. Barbour. 1927.

25538. Paratype. La Source, Gonave Id., Haiti. W. J. Eyerdam. T. Barbour. 1927.

AMEIVA BIRDORUM Grant

1932, Journ. Dept. Agric. Porto Rico, **16**, p. 160.

36385–94. 36412–8. 19 Paratypes. Diablo Id., off Fajardo, Porto Rico. C. Grant. T. Barbour. 1933.

Dr. Barbour dislikes this name very much—why not *avium*?

AMEIVA CHRYSOLAEMA BOEKERI Mertens

1938, Senckenbergiana, **20**, p. 338, fig. 6.

44757. Paratype. S. of Fondo Negro, Dominican Republic. H. Böker. Exch. Senckenberg Mus. 1938.

AMEIVA CHRYSOLAEMA WOODI Cochran

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 181.

37583. Type. Isle Tortue, Haiti. T. Barbour. T. Barbour. 1934.

37584–92. 28 Paratypes. Isle Tortue, Haiti. T. Barbour. T. Barbour. 1934.

AMEIVA FESTIVA MIADIS Barbour & Loveridge

1929, Bull. Mus. Comp. Zoöl., **69**, p. 141.

26970. Type. Great Corn Id., off Nicaragua. J. L. Peters. Mus. Exped. 1928.

26971–5. 5 Paratypes. Great Corn Id., off Nicaragua. J. L. Peters. Mus. Exped. 1928.

AMEIVA MAYNARDII PARVINAGUAE Barbour & Shreve

1936, Proc. New England Zoöl. Club, **16**, p. 3.

42039. Type. Little Inagua Id., Bahamas. J. C. Greenway, Jr. Mus. Exped. 1936.

42040. Paratype. Little Inagua Id., Bahamas. J. C. Greenway, Jr. Mus. Exped. 1936.

AMEIVA ROSAMONDAE Cochran

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 179.

37567. Holotype. Saona Id., Dominican Republic. T. Barbour. T. Barbour. 1934.

AMEIVA WETMOREI ELANORAE Grant and Roosevelt

1932, Journ. Dept. Agric. Porto Rico, **16**, p. 48.

36419–30. 11 Paratypes. Caja de Muertos Id., Porto Rico. C. Grant. T. Barbour. 1933.

Subsequently Grant (*loc. cit.* p. 161) raised this to specific rank on the grounds that *wetmorei* has 13-14 femoral pores, *elanorae* only 12.

AMPHIBOLURUS BARBATUS MINIMUS Loveridge

1933, Proc. New England Zoöl. Club, **13**, p. 69.

32969–71. 3 Paratypes. Geraldton, W. Australia. W. E. Schevill. Harvard Australian Exped. 1931.

32972. Type. West Wallaby Id., W. Australia. G. M. Allen. Harvard Australian Exped. 1931.

32973–8. 6 Paratpyes. West Wallaby Id., W. Australia. G. M. Allen. Harvard Australian Exped. 1931.

AMPHIBOLURUS DARLINGTONI Loveridge

1932, Proc. New England Zoöl. Club, **13**, p. 33.

32958. Type. Mullewa, Western Australia. P. J. Darlington. Harvard Australian Exped. 1931.

32959. Paratype. Mullewa, Western Australia. P. J. Darlington. Harvard Australian Exped. 1931.

AMPHISBAENA MPWAPWAENSIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 378.

30767. Type. Mpwapwa, Ugogo, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30768. Paratype. Mpwapwa, Ugogo, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

AMPHISBAENA RONDOENSIS Loveridge

1941, Bull. Mus. Comp. Zoöl., **87**, 394, fig. 23.

47951. Type. Nchingidi, Rondo Plateau, Tanganyika Territory. A. Loveridge. Mus. Exped. 1939.

47952–92. 40 Paratypes. Nchingidi, Rondo Plateau, Tanganyika Territory. A. Loveridge. Mus. Exped. 1939.

Anadia nicefori Loveridge

1929, Proc. Biol. Soc. Wash., **42**, p. 99.

27340. Holotype. Macanal, Rio Garagoa, Eastern Andes, Colombia. Hno. Nicéforo Maria. Hno Nicéforo Maria. 1928.

Dunn (1944, Caldesia, p. 67) refers this species to *Ptychoglossus*, separated from *Anadia* by their less squarish and more or less keeled dorsal scales.

Anolis albi Barbour

1932, Proc. New England Zoöl. Club, **12**, p. 101.

32301. Type. Andagoya, Choco, Colombia. W. H. White. W. H. White. 1931.

32302. Paratype. Andagoya, Choco, Colombia. W. H. White. W. H. White. 1931.

Anolis bahorucoensis Noble & Hassler

1933, Amer. Mus. Novit., No. 652, p. 11.

43822. Paratype. Valle de Polo etc., Dominican Republic. W. G. Hassler. Exch. J. C. Armstrong. 1938.

45952–3. 2 Paratypes. Palomino Springs, Dominican Republic. W. G. Hassler. Exch. American Mus. 1941.

Anolis clivicolus Barbour & Shreve

1926, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 251.

39664. Type. Loma Cordero to Pico Turquino, Cuba. J. A. Acunã. S. C. Bruner. 1935.

39665. Paratype. Loma Cordero to Pico Turquino, Cuba. J. A. Acunã. S. C. Bruner. 1935.

Anolis cobanensis Stuart

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 464, p. 6.

46516. Paratype. Finca Chichen, Alta Verapaz, Guatemala. L. C. Stuart. Exch. Michigan Mus. 1942.

ANOLIS CONSPERSUS LEWISI Grant = ANOLIS GRAHAMI LEWISI Grant

1940, "The Herpetology of the Cayman Islands," p. 23.

45106. Type. Grand Cayman Id. C. Grant. T. Barbour. 1939.
45107–110. 4 Paratypes. Grand Cayman Id. C. Grant. T. Barbour. 1939.

The paratypes listed above are not so designated but are part of the "11 specimens in the writer's collection" referred to on p. 25.

ANOLIS CRISTATELLUS COOKI Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 220.

34788–9. 2 Paratypes. Brea Point, S. W. Porto Rico. C. Grant. T. Barbour. 1933.

ANOLIS CRISTATELLUS WILEYI Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 220.

34792. Type. Culebra Id., Porto Rico. C. Grant. T. Barbour. 1933.
35951–66. 16 Paratypes. Culebra Id., Porto Rico. C. Grant. T. Barbour. 1933.

ANOLIS DARLINGTONI Cochran

1939, Proc. New England Zoöl. Club, **18**, p. 1.

44360. Type. Loma Vieja, Cordillera Central, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.
44361. Paratype. Loma Vieja, Cordillera Central, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.
44362. Paratype. Loma Rucilla, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.
44363. Paratype. Constanza, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.
44364. Paratype. Valle Nuevo, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

ANOLIS DISTICHUS ATAVELENSIS Noble & Hassler
See A. DOMINICENSIS ATAVELENSIS Noble & Hassler

ANOLIS DISTICHUS CAUDALIS Cochran
See A. DOMINICENSIS CAUDALIS Cochran

ANOLIS DISTICHUS JULIAE Cochran
See A. DOMINICENSIS JULIAE Cochran

ANOLIS DOMINICENSIS ALTAVELENSIS Noble & Hassler=
A. DISTICHUS ALTAVELENSIS Noble & Hassler

1933, Amer. Mus. Novit., No. 652, p. 9.

45948–9. 2 Paratypes. Alta Vela Id., Dominican Republic. W. G. Hassler. Exch. American Mus. 1941.

ANOLIS DOMINICENSIS CAUDALIS Cochran=
A. DISTICHUS CAUDALIS Cochran

1932, Proc. Biol. Soc. Washington, **45**, p. 185.

25509–18. 13 Paratypes. Pte. à Raquette, Gonave Id., Haiti. W. J. Eyerdam. T. Barbour. 1927.

ANOLIS DOMINICENSIS JULIAE Cochran=
A. DISTICHUS JULIAE Cochran

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 169.

37517. Type. Isle Vache, Haiti. T. Barbour. T. Barbour. 1934.

37518–9. 2 Paratypes. Isle Vache, Haiti. T. Barbour. T. Barbour. 1934.

ANOLIS EQUESTRIS HASSLERI Barbour & Shreve

1936, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 251.

11178. Holotype. Los Indios, Isle of Pines, Cuba. G. A. Link. Exch. Carnegie Mus. 1912.

ANOLIS EQUESTRIS NOBLEI Barbour & Shreve

1936, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 250.

6924. Paratype. Santiago, Oriente, Cuba. W. Robinson. W. Robinson. 1904.

8977. Paratype. Nr. Guantanamo, Oriente, Cuba. C. T. Ramsden. C. T. Ramsden. 1913.

26653. Type. Sierra de Nipe, Oriente, Cuba. E. Mitchell. E. Mitchell. 1928.

ANOLIS FAIRCHILDI Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 357.

38245. Paratype. Cotton Cay, Cay Sal, Bahamas. P. Bartsch. Exch. U. S. Nat. Mus. 1934.

ANOLIS GAIGEI Ruthven = A. TROPIDOGASTER Hallowell

1916, Occ. Papers Mus. Zool. Univ. Michigan, No. 32, p. 6, pl. iii.

6562. Paratypes. Pueblo Viega, Sta. Marta Mtns., Colombia. W. W. Brown. O. Bangs. 1899.

ANOLIS GRAHAMI LEWISI Grant. See A. CONSPERSUS LEWISI Grant

ANOLIS HAGUEI Stuart

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 464, p. 3.

46515. Paratype. Finca Chichén, Alta Verapaz, Guatemala. L. C. Stuart. Exch. Michigan Mus. 1942.

ANOLIS INCOMPERTUS INCOMPERTUS Barbour

1932, Proc. New England Zoöl. Club, **12**, p. 99.

32309. Type. Villavicencio, San Martin, Colombia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1931.

32310–21. 12 Paratypes. Villavicencio, San Martin, Colombia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1931.

ANOLIS INCOMPERTUS NICEFORI Barbour

1932, Proc. New England Zoöl. Club, **12**, p. 100.

32322. Type. Humbo, Dept. Boyaca, Colombia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1931.

32323. Paratype. Humbo Dept. Boyacá, Columbia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1931.

ANOLIS KEMPTONI Dunn

1940, Proc. Acad. Nat. Sci. Philadelphia, **92**, p. 111.

46247. Paratype. Above Boquete, Panama Republic. E. R. Dunn. Exch. E. R. Dunn. 1942.

ANOLIS LEUCOPHAEUS MARIGUANAE Cochran

1931, Journ. Washington Acad. Sci., **21**, p. 40.

38180–1. 2 Paratypes. Mariguana Cay, Bahamas. P. Bartsch. Exch. U. S. Nat. Mus. 1934.

ANOLIS LEUCOPHAEUS SULARUM Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 354.

38013. Type. West Booby Cay off Atwood's Cay, Bahamas. J. C. Greenway, Jr. T. Barbour. 1934.

38014–5. 2 Paratypes. West Booby Cay off Atwood's Cay, Bahamas. J. C. Greenway, Jr. T. Barbour. 1934.

ANOLIS LINEATOPUS COXI Grant

1940, "Jamaica Today," p. 155.

45079. Holotype. Portland Point, Jamaica. C. Grant. T. Barbour. 1939.

ANOLIS LINEATOPUS NECKERI Grant

1940, "Jamaica Today," p. 155.

45087. Holotype. Mandeville, Jamaica. C. Grant. T. Barbour. 1939.

ANOLIS LOVERIDGEI Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 47.

38700. Type. Portillo Grande, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

38834. Paratype. Portillo Grande, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

38831. Paratype. Mataderos Mtns., Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

38832–3. 2 Paratypes. Dept. of Yoro, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

ANOLIS MARIARUM Barbour

1932, Proc. New England Zoöl. Club, **12**, p. 100.

32303. Type. Sampedro, Dept. Antioquia, Colombia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1931.

32304–8. 5 Paratypes. Sampedro, Dept. Antioqua, Colombia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1931.

ANOLIS MONTICOLA Shreve

1936, Proc. New England Zoöl. Club, **15**, p. 93.

38296. Holotype. N. & E. foothills, Massif de la Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

ANOLIS PATRICIUS Barbour=ANOLIS HOMOLECHIS Cope

1929, Proc. New England Zoöl. Club, **11**, p. 37.

28759. Type. Mina Piloto, Sagua de Tanamo, Cuba. C. T. Ramsden. C. T. Ramsden. 1929.

28760–75. 16 Paratypes. Mina Piloto, Sagua de Tanamo, Cuba. C. T. Ramsden. C. T. Ramsden. 1929.

ANOLIS ROOSEVELTI Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 221.

36136. Holotype. Culebra Id., Porto Rico. C. Grant. T. Barbour. 1933.

ANOLIS RUTHVENI Stuart=A. UNIFORMIS Cope

1935, Occ. Papers Mus. Zool. Michigan, No. 310, p. 1.

46309. Paratype. Santa Teresa, El Peten, Guatemala. L. C. Stuart. Exch. Univ. Mich. Mus. 1939.

ANOLIS SMARAGDINUS Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 355.

37983. Type. Mortimer's South Point, Long Id., Bahamas. T. Barbour. T. Barbour. 1934.

37984. Paratype. Mortimer's South Point, Long Id., Bahamas. T. Barbour. T. Barbour. 1934.

38218–20. 3 Paratypes. Clarencetown, Long Id., Bahamas. T. Barbour. T. Barbour. 1934.

ANOLIS SMINTHUS Dunn & Emlen

1932, Proc. Acad. Nat. Sci. Philadelphia, **84**, p. 26.

32348. Paratype. San Juancito, 6400–7000 feet, Honduras Republic. J. T. Emlen. Exch. Acad. Nat. Sci. Phil. 1932.

ANOLIS STEJNEGERI Barbour

1931, Copeia, p. 88.

29907. Holotype. Key West, Florida. A. G. Elbon. T. Barbour. 1931.

ANOLIS TROPIDOGASTER Hallowell. See A. GAIGEI Ruthven

ANOLIS UNIFORMIS Cope. See A. RUTHVENI Stuart

ANOLIS USTUS VERAE-PACIS Barbour

1932, Proc. New England Zoöl. Club, **12**, p. 98.

32324. Type. Hacienda Chimoxan, Alta Vera Paz. A. W. Anthony. T. Barbour. 1931.

32325–31. 7 Paratypes. Vera Paz, Guatemala. A. W. Anthony. T. Barbour. 1931.

ANOLIS UTOWANAE Barbour

1932, Copeia, p. 12.

31035. Holotype. Mazatlan, Sinaloa, Mexico. T. Barbour. T. Barbour. 1931.

ANOMALEPIS ASPINOSUS Taylor

1939, Proc. New England Zoöl. Club, **17**, p. 92.

14782. Type. Perico, Peru. G. K. Noble. Harvard Peruvian Exp. 1916.

14781–3–5. 17401. 4 Paratypes. Perico, Peru. G. K. Noble. Harvard Peruvian Exp. 1916.

The last number is misprinted as "14701" in the description.

ANOMALEPIS DENTATUS Taylor=A. MEXICANUS Jan

1939, Proc. New England Zoöl. Club, **17**, p. 90.

29220. Type. Barro Colorado Id., Canal Zone. E. R. Dunn. E. R. Dunn. 1930.

Though registered as collected by J. Zetek, Dr. E. R. Dunn informs us that he was the collector of this little worm snake.

ANOMALEPIS MEXICANUS Jan. See A. DENTATUS Taylor

APARALLACTUS TURNERI Loveridge

1935, Bull. Mus.Comp. Zoöl., **79**, p. 9.

39952. Type. Sokoki Forest, nr. Malindi, Kenya Colony. H. J. A. Turner. H. J. A. Turner. 1934.

40120. Paratype. Peccatoni, nr. Witu, Kenya Colony. A. Loveridge. A. Loveridge. 1934.

40121–2. 2 Paratypes. Mkonumbi, nr. Witu, Kenya Colony. A. Loveridge. A. Loveridge. 1934

40122–3. 2 Paratypes. Between Mombosasa & Witu, Kenya Colony. A. Loveridge. A. Loveridge. 1934.

ARISTELLIGER COCHRANAE Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 399, pl. xlviii.

34641–8. 8 Paratypes. Navassa Id., Dominican Republic. C. Grant. T. Barbour. 1933.

ARTHROLEPTIDES DUTOITI Loveridge

1935, Bull. Mus. Comp. Zoöl., **79**, p. 17.

19864. Type. Koitobos River, Mt. Elgon, Uganda. C. A. du Toit. C. A. du Toit. 1934.

ARTHROLEPTIS BEQUAERTI Barbour & Loveridge

1929, Proc. New England Zoöl. Club, **11**, p. 25.

14751. Type. Mt. Vissoke, Belgian Congo. J. Derscheid. Harvard Med. Sch. Exped. 1927.

14752–64. 13 Paratypes. Mt. Vissoke, Belgian Congo. J. Derscheid. Harvard Med. Sch. Exped. 1927.

ARTHROLEPTIS DALENEI Hoffman

1940, Soölog. Navor. Nas. Mus. Bloemfontein, **1**, p. 97, fig. 1.

24505–8. 4 Paratypes. Greytown, Natal. A. C. Hoffman. Exch. Bloemfontein Mus. 1941.

ARTHROLEPTIS RUNGWENSIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 386.

17141. Holotype. Ilolo, Rungwe District, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

ARTHROLEPTIS STENODACTYLUS LÖNNBERGI Nieden
See A. S. ULUGURUENSIS Loveridge

ARTHROLEPTIS STENODACTYLUS ULUGURUENSIS Loveridge=
A. S. LÖNNBERGI Nieden

1932, Proc. Biol. Soc. Washington, **45**, p. 61.

16100. Type. Nyingwa, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

13122–6. 5 Paratypes. Nyingwa, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

In addition there are numerous paratypes from ten other localities in the mountains. This form only came to be described when Ahl, having compared a topotype with the type of *lönnbergi* in the Berlin Museum, insisted that they were different. Later a topotype of *lönnbergi* was received from the Royal Swedish Museum and found to be subspecifically indistinguishable.

ARTHROLEPTIS UKINGENSIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 385.

17076–8. 3 Paratypes. Ilolo, Rungwe District, Tanganyika Territory. A Loveridge. Mus. Exped. 1930.

17137. Type. Madehani, Ukinga Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

17138–40. 3 Paratypes. Madehani, Ukinga Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

ARTHROLEPTIS XENODACTYLOIDES NKUKAE Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 427.

17029. Type. Nkuka Forest, Rungwe Mtn., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

17030–50. 20+ Paratypes. Nkuka Forest, Rungwe Mtn., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

17026–7. 2 Paratypes. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

17028. Paratypes. Kigogo, Uzungwe Mtns., Tangangika Territory. A. Loveridge. Mus. Exped. 1930.

ASPIDURA GUENTHERI Ferguson

1876, Proc. Zool. Soc. London, p. 819.

28467. Cotype. Ceylon, near the coast. W. Ferguson. Exch. British Mus. 1929.

ATELOPUS CHIRIQUIENSIS Shreve

1936, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 269.

19966. Type. Chiriqui Viejo, Rio Chiriqui, Panama Republic. S. F. Hildebrand. S. F. Hildebrand. 1935.

19967–71. 5 Paratypes. Chiriqui Viejo, Rio Chiriqui, Panama Republic. S. F. Hildebrand. S. F. Hildebrand. 1935.

ATELOPUS CRUCIGER VOGLI L. Müller

1934, Zool. Anz., **108**, p. 151.

20923–5. 3 Paratypes. Nr. Hacienda Trinidad, nr. Maracay, Las Penas, Venezuela. C. Vogt. Exch. Munich Mus. 1936.

ATELOPUS VARIUS ZETEKI Dunn

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 71.

16018. Type. El Valle de Antón, Panama Republic. J. Zetek. T. Barbour. 1930.

16019–20. 2 Paratypes. El Valle de Antón, Panama Republic. J. Zetek. T. Barbour. 1930.

ATHERIS BARBOURI Loveridge

1930, Proc. New England Zoöl. Club, **11**, p. 107.

29055. Type. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

29056–7. 2 Paratypes. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus Exped. 1930.

ATRACTUS CLARKI Dunn & Bailey

1939, Bull. Mus. Comp. Zoöl., **86**, p. 8.

28800. Holotype. Cana Mines, Santa Cruz de Cana, Darien, Panama Republic. Dr. H. C. Clark. T. Barbour. 1938.

ATRACTUS LOVERIDGEI Amaral

1930, Bull. Antivenin Inst. Amer. (Philadelphia), **4**, p. 28.

29059. Holotype. Jerico, Colombia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1929.

ATRACTUS NICÉFORI Amaral

1930, Bull. Antivenin Inst. Amer. (Philadelphia), **4**, p. 28.

29058. Holotype. Jerico, Colombia. Hno. Nicéforo Maria. Hno. Nicéforo Maria. 1929.

ATRACTUS NIGRICAUDUS Schmidt & Walker

1943, Zool. Series Field Mus. Nat. Hist., **24**, p. 327.

45909. Type. Huachon, Dept. Junin, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1941.

45910. Paratype. Huachon, Dept. Junin, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1941.

AUDANTIA ARMOURI Cochran

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 171.

37523. Type. La Selle Peak, Haiti. A. Audant. T. Barbour. 1934.

37524. Paratype. La Selle Peak, Haiti. A. Audant. T. Barbour. 1934.

AUDANTIA SHREVEI Cochran

1939, Proc. New England Zoöl. Club, **18**, p. 2.

44365. Type. Valle Nuevo, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

44366–7. 2 Paratypes. Valle Nuevo, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

44368–72. 5 Paratypes. Loma Pelona, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

44373. 1 Paratype. Loma Rucilla, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

BACHIA TALPA Ruthven

1925, Proc. Boston Soc. Nat. Hist., **38**, p. 101, figs. 1-3.

14636. Paratype. Sta. Marta Mtns., Colombia. A. G. Ruthven. Exch. Michigan Mus. 1921.

BARYGENYS CHEESMANAE Parker

1936, Ann. Mag. Nat. Hist. (10), **17**, p. 74, fig. 1.

19921. Paratype. Mt. Tafu, 8500 ft., New Guinea. L. E. Cheesman. Exch. British Mus. 1935.

BASILISCUS BARBOURI Ruthven

1914, Proc. Biol. Soc. Washington, **27**, p. 9, pl. i.

6550. 2 Paratypes. La Concepcion, Sta. Marta Mtns., Colombia. W. W. Brown. O. Bangs. 1898.

6560–5. 6572. 8 Paratypes. Palomina, Sta. Marta Mtns., Colombia. W. W. Brown. O. Bangs. 1898.

11307. Paratype. Fundacion, Sta. Marta Mtns., Colombia. A. G. Ruthven. Exch. Michigan Mus. 1915.

As stated by the author, in a footnote, most of these specimens are too young to show the characters of the species.

BATRACHOSEPS CATALINAE Dunn = BATRACHOSEPS ATTENUATUS CATALINAE Dunn

1922, Copeia, p. 62.

25763. Paratype. Santa Catalina Island, California. J. Hurter. Exch. U. S. Nat. Mus. 1944.

BATRACHUPERUS TIBETANUS Schmidt

1925, Amer. Mus. Novit., No. 157, p. 5.

17426. Paratype. About 33° N. on Tibetan border of Kansu, China. R. B. Ekvall. Exch. Field Mus. 1931.

BAVAYIA CYCLURA CRASSICOLLIS Roux

1913, in Sarasin & Roux, Nova Caledonia, Zool., **1**, p. 89.

27935. Paratype. Netché, Maré, Loyalty Is. Sarasin & Roux. Exch. Basel Museum. 1929.

BEDRIAGAIA MOREAUI Loveridge

1936, Proc. New England Zoöl. Club, **15**, p. 68.

39799. Holotype. Amani, Usambara Mtns., Tanganyika Territory R. E. Moreau. R. E. Moreau. 1936.

BOGERTIA LUTZAE Loveridge

1941, Proc. Biol. Soc. Washington, **54**, p. 196.

46190–1. Cotypes. Pituba, Sao Salvador, Bahia, Brazil. Dr. Bertha Lutz. Mus. Nac. do Brasil. 1941.

These are also genotypes of a form occupying a position intermediate between *Gehyra* and *Hemidactylus*.

BOLITOGLOSSA ARBOREA Taylor

1941, Herpetologica, **2**, p. 62, fig. 4.

24546. Paratype. Near Tianguistengo, Hidalgo, Mexico. Roberts & Taylor. Exch. E. H. Taylor. 1941.

Bolitoglossa dimidiata Taylor

1941 (1940), Univ. Kansas Sci. Bull., **26**, p. 408, figs. 1-2.

24543. Paratype. Hidalgo, Guerrero, Mexico. E. H. Taylor. Exch. E. H. Taylor. 1941.

Bolitoglossa galaena Taylor

1941, Proc. Biol. Soc. Washington, **54**, p. 83.

25764. Paratype. 15 miles west of Galaena, Nuevo Leon, Mexico. Hobart M. Smith. Exch. U. S. Nat. Mus. 1944.

Bolitoglossa lavae Taylor

1942, Univ. Kansas Sci. Bull., **28**, p. 295, pl. xxvii, figs. 5-6.

25603–4. 2 Paratypes. 2 miles west of La Joya, Veracruz, Mexico. E. H. Taylor. Exch. E. H. Taylor. 1942.

Bolitoglossa multidentata (Taylor)
See Oedipus multidentata Taylor

Bolitoglossa nigroflavescens Taylor

1941, Univ. Kansas Sci. Bull., **27**, p. 148, pl. viii; pl. ix, figs. 9-10.

25607–8. 2 Paratypes. Cerro Ovando, 5000–6000 ft., Chiapas, Mexico. H. M. Smith. Exch. E. H. Taylor. 1942.

Bolitoglossa nigromaculata Taylor

1941, Univ. Kansas Sci. Bull., **27**, p. 141, figs. 1 A-B.

25765. Paratype. Cuatulapan, Veracruz, Mexico. Hobart M. Smith. Exch. U. S. Nat. Mus. 1944.

Bolitoglossa occidentalis Taylor

1942, Univ. Kansas Sci. Bull., **28**, p. 145.

25609. Paratype. Finca Juarez, Chiapas, Mexico. H. M. Smith. Exch. E. H. Taylor. 1942.

Bolitoglossa robertsi (Taylor). See Oedipus robertsi Taylor

Bolitoglossa smithi (Taylor). See Oedipus smithi Taylor

BOLITOGLOSSA TERRESTRIS Taylor

1941, Univ. Kansas Sci. Bull., **27**, p. 115.

25613–4. 2 Paratypes. 4–10 miles south of Tianguistengo, Hidalgo, Mexico. E. H. Taylor. Exch. E. H. Taylor. 1942.

BOLITOGLOSSA UNGUIDENTIS Taylor

1941, Herpetologica, **2**, p. 57, figs. 1-3.

25615–6. 2 Paratypes. Cerro San Felipe, Oaxaca, Mexico. E. H. Taylor. Exch. E. H. Taylor. 1942.

BOLITOGLOSSA XOLOCALCAE Taylor

1941, Univ. Kansas Sci. Bull., **27**, p. 150, pl. vii; pl. ix, figs. 7-8.

25617–8. 2 Paratypes. Cerro Ovando, 6000–8000 ft., Chiapas, Mexico. H. M. Smith. Exch. E. H. Taylor. 1942.

BOTHROPS, see also TRIMERESURUS

BOTHROPS ALBOCARINATA Shreve

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 130.

36989. Holotype. Pastaza River between Canelos & Maranon River, Ecuador. C. Spencer. T. Barbour. 1932.

This name has precedence over *B. alticola* Parker, 1934, Ann. Mag. Nat. Hist. (10), **14**, p. 272, a species described from Loja, Ecuador.

BOTHROPS BARBOURI (Dunn). See AGKISTRODON BROWNI Shreve

BOTHROPS NIGROVIRIDIS MARCHI Barbour & Loveridge

1929, Bull. Antivenin Inst. Amer. (Philadelphia), **3**, p. 1.

27260. Type. Quimistan, Santa Barbara, Honduras Republic. D. March. T. Barbour. 1928.

27567–9. 3 Paratypes. Cofradia to Quimistan, Santa Barbara, Honduras Republic. D. March. T. Barbour. 1929.

The museum has now a good series of this handsome pit-viper.

BOULENGERULA CHANGAMWENSIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 382.

16301. Type. Changamwe, near Mombasa, Kenya Colony. A. Loveridge. Mus. Exped. 1930.

16302–4. 3 Paratypes. Changamwe, nr. Mombasa, Kenya Colony A. Loveridge. Mus. Exped. 1930.

BOULENGERULA TAITANUS Loveridge

1935, Bull. Mus. Comp. Zoöl., **79**, p. 16.

2001. Type. Mt. Mbololo, Teita, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

20002–23. 21 Paratypes. Mt. Mbololo, Teita, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

BREVICEPS PARVUS CAFFER Hewitt = B. PENTHERI Werner

1932, Ann. Natal Mus. (Pietermaritzburg), **7**, p. 109.

17691. Paratype. Gleniffer, Kei Road, Cape Province, South Africa. G. A. Ranger. Exch. Albany Mus. 1932.

BREVICEPS PENTHERI Werner

See BREVICEPS PARVUS Hewitt and BREVICEPS PARVUS CAFFER Hewitt

BUFO BLANFORDI Boulenger. See B. VIRIDIS SOMALACUS Meek

BUFO BOREAS HALOPHILUS Baird & Girard. See B. B. NELSONI Stejneger

BUFO BOREAS NELSONI Stejneger = B. B. HALOPHILUS Baird & Girard

1893, N. Amer. Fauna, No. 7, p. 220, pl. iii, figs. 4 a-b.

15015. Paratype. Oasis Valley, Nevada. Stephens. Exch. U. S. Nat. Mus. 1928.

BUFO BUFO WRIGHTI Schmidt & Liu

1940, Field Mus. Nat. Hist. Zool. Series, **24**, p. 151, fig. 16B.

24180–1. 2 Paratypes. Tailing, Szechwan, China. H. Stevens. Exch. Field Mus. 1940.

BUFO CAMERUNENSIS CAMERUNENSIS Parker

1936, Proc. Zool. Soc. London, p. 153.

22331. Paratype. Oban, Calabar, Southern Nigeria. P. A. Talbot. Exch. British Mus. 1935.

22332–3. 2 Paratypes. Ja River, French Cameroons. G. L. Bates. Exch. British Mus. 1935.

Bufo exsul Myers

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 460, p. 3.

23056–7. 2 Paratypes. Deep Springs, Inyo Co., California. Ferris, Wiggins & Myers. Stanford Univ. Mus. 1942.

Bufo garmani Meek = B. r. regularis Reuss

1897, Field Mus. Nat. Hist. Zool. Series, **1**, p. 176.

19082. Cotype. Halleh (Haili), British Somaliland. C. Akeley. Exch. Field Mus. 1933.

Bufo lönnbergi Anderson = B. l. lönnbergi Andersson

1911, Svenska Vetensk.-Akad. Handl. (Stockholm), **47**, No. 6, p. 35, pl. ii, figs. 4, 6.

17804. 17830–1. 3 Cotypes. Mt. Kenya, Kenya Colony. E. Lönnberg. Exch. Stockholm Mus. 1932.

Bufo lönnbergi nairobiensis Loveridge

1902, Occ. Papers Boston Soc. Nat. Hist. **8**, p. 48.

3237. Type. Nairobi, Kenya Colony. F. J. Jackson. Exch. British Mus. 1913.

3238. Paratype. Nairobi, Kenya Colony. F. J. Jackson. Exch. British Mus. 1913.

Bufo micranotis rondoensis Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 387.

25090. Type. Nchingidi, Rondo Plateau, Tanganyika Territory. A. Loveridge. Mus. Exped. 1939.

25091–100. 10 Paratypes. Nchingidi, Rondo Plateau, Tanganyika, Territory. A. Loveridge. Mus. Exped. 1939.

Bufo minshanicus Stejneger

1926, Journ. Washington Acad. Sci., **16**, p. 445.

25689. Paratype. Choni, Tao River, Kansu, Inner Mongolia. F. R. Wulsin. Exch. U. S. Nat. Mus. 1944.

BUFO PARKERI Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 382.

16330. Type. Mangasini, Usandawi, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16331–50. 20 Paratypes. Mangasini, Usandawi, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

BUFO REGULARIS REGULARIS Reuss. See B. GARMANI Meek and B. R. KISOLOENSIS Loveridge

BUFO REGULARIS GUTTURALIS Power

1927, Trans. Roy. Soc. S. Africa, **14**, p. 416, pl. xxi, fig. 2.

15403. Cotype. Lobatsi, Bechuanaland Protectorate. J. H. Power. Exch. Kimberly Mus. 1929.

BUFO REGULARIS HUMBENSIS Monard

1937, Bull Soc. Neuchatel, Sci. Nat., **62**, p. 26.

23712. Cotype. Mulondo, Angola. A. Monard. Exch. Basle Mus. 1938.

BUFO REGULARIS KISOLOENSIS Loveridge = B. R. REGULARIS Reuss.

1932, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 52.

19083–90. 8 Paratypes. Kisolo, Kigezi District, Uganda. E. Heller. Exch. Field Mus. 1933.

BUFO SMITHI Stejneger

1907, U. S. Nat. Mus. Bull., **58**, p. 64.

3689, 25690. 2 Paratypes. Kochi, Toza Province, Shikoku Id., Japan. H. M. Smith. Exch. U. S. Nat. Mus. 1919, 1944.

BUFO TAITANUS Peters = BUFO T. TAITANUS Peters

1878, Monatsb. Akad. Wiss. Berlin, p. 208, pl. ii, fig. 9.

22327. Cotype. Teita (Taita), Kenya Colony. J. Hildebrandt. Exch. Berlin Mus. 1937.

Bufo taitanus uzungwensis Loveridge

1932, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 44.

16380. Paratype. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16382. Paratype. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16383. Type. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16384. Paratype. Njombe, Ubena Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16385. Paratype. Lukungu, Ubena Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16386. Paratype. Nyamwanga, Poroto Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

Bufo togoensis Ahl

1924, Arch. Naturg., **90** A, Heft 5, p. 253.

19576. Cotype. Adele (as Bismarckburg), Togo. L. Conradt. T. Barbour. 1933.

Bufo urunguensis Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 383.

16376. Type. Kitungulu, Urungu, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16377–9. 3 Paratypes. Kitungulu, Urungu, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

Bufo ushoranus Loveridge

1932, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 45.

10330 Holotype. Ulugu, Ushora, Tanganyika Territory. A. Loveridge. T. Barbour. 1925.

Bufo vertebralis albiventris Power

1927, Trans. Roy. Soc. S. Africa, **14**, p. 418, pl. xxii.

15402. Cotype. Lobatsi, Bechuanaland Protectorate. J. H. Power. Exch. Kimberly Mus. 1929.

Bufo viridis somalacus Meek=B. blanfordi Boulenger

1897, Field Mus. Nat. Hist. Zool. Series, **1**, p. 177.

19104–5. 2 Cotypes. Halleh (Haili), British Somaliland. C. Akeley. Exch. Field Mus. 1933.

Bungarus flaviceps baluensis Loveridge

1938, Proc. Biol. Soc. Washington, **51**, p. 44.

43601. Type. Kenokok River, Mt. Kinabalu, Borneo. J. A. Griswold, Jr. Harvard Primate Exped. 1937.

43602. Paratype. Kenokok River, Mt. Kinabalu, Borneo. J. A. Griswold, Jr. Harvard Primate Exped. 1937.

Caecilia bassleri Dunn

1942, Bull. Mus. Comp. Zoöl., **91**, p. 518.

19401. Type. Pastaza River between Canelos and Maranon River, Ecuador. C. Spencer. T. Barbour. 1933.

Caecilia caribea Dunn

1942, Bull. Mus. Comp. Zoöl., **91**, p. 509.

24520. Type. Pensilvania, s. of Medellin, Colombia. Hno. Nicéforo Maria. E. R. Dunn. 1941.

Caecilia degenerata Dunn

1942, Bull. Mus. Comp. Zoöl., **91**, p. 505.

17383. Type. Garagoa, N. E. of Bogota, Colombia. Hno. Nicéforo Maria. T. Barbour. 1931.

25593–4. 2 Paratypes. Valley of the Rio Negro at Coachi, etc., Colombia. Hno. Nicéforo Maria. Exch. Am. Mus. Nat. Hist. 1943.

Caecilia elongata Dunn

1942, Bull. Mus. Comp. Zoöl., **91**, p. 527.

21521. Paratype head. Yavisa, Darien, Panama Republic. Dr. H. C. Clark. T. Barbour. 1935.

Calamaria gervaisii iridescens Taylor

1917, Philippine Journ. Sci., **12**, p. 360.

46681. Paratype. Canlaon Volcano, Occidental Negros, Philippine Ids. E. H. Taylor. Exch. Carnegie Mus. 1942.

CALAMARIA LUMBRICOIDEA GRISWOLDI Loveridge

1938, Proc. Biol. Soc. Washington, **51**, p. 43.

43580. Type. Luidan River, Mt. Kinabalu, Borneo. J. A. Griswold, Jr. Harvard Primate Exped. 1937.

43581. Paratype. Luidan River, Mt. Kinabalu, Borneo. J. A. Griswold, Jr., Harvard Primate Exped. 1937.

CALLISAURUS DRACONOIDES BREVICEPS Bogert & Dorson

1942, Copeia, p. 173.

46679–80. 2 Paratypes. Guirocoba, S.E. of Alamos, Sonora, Mexico. J. W. Hilton. Exch. Am. Mus. Nat. Hist. 1942.

CALOTES BREVIPES Werner

1904, Zool. Anz., **27**, p. 462.

33519. Paratype. Tonkin, French Indo-China. H. Fruhstorfer. Exch. Senckenberg Mus. 1932.

The original description mentions two male "cotypes" only, yet this young specimen, received from F. Werner in 1904 by the Senckenberg Museum, is clearly labeled "paratype."

CELESTUS BARBOURI Grant

1940, "The Herpetology of Jamaica, II, The Reptiles," p. 101.

45169. Type. Mandeville, Jamaica. C. Grant. T. Barbour. 1939.

CELESTUS CRUSCULUS CUNDALLI Grant

1940, "Jamaica To-day," p. 157.

45163. Holotype. Mandeville, Jamaica. C. Grant. T. Barbour. 1929.

CELESTUS CRUSCULUS MOLESWORTHI Grant

1940, "Jamaica To-day," p. 157.

45184. Holotype. Kingston, Jamaica. C. Grant. T. Barbour. 1939.

CELESTUS DARLINGTONI Cochran

1939, Proc. New England Zoöl. Club, **18**, p. 2.

44374. Type. Valle Nuevo, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

44375–6. 2 Paratypes. Valle Nuevo, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

Celestus delasagra nigropunctatus Barbour & Shreve

1937, Bull. Mus. Comp. Zool., **80**, p. 278.

7426. Paratype. Cuba-eastern. Exch. U. S. Nat. Mus. 1912.

42504. Type. Mtns. N. of Imias, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

42506. Paratype. El Yunque de Baracoa, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

42563. Paratype. Cuchillo de Guajimero, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

Celestus duquesneyi Grant

1940, "Jamaica To-day," p. 157.

45194. Holotype. Portland Point, Jamaica. C. Grant. T. Barbour. 1939.

Centrolene valerioi Dunn

1931, Occ. Papers Boston Soc. Nat. Hist., **5**, p. 397.

16003. Type. La Palma, Costa Rica. E. R. Dunn. E. R. Dunn. 1930.

16004. Paratype. La Palma, Costa Rica. E. R. Dunn. E. R. Dunn. 1930.

Cerastes vipera inornatus Werner

1929, Sitz. Akad. Wiss. Wien, **138**, 1, p. 7.

27509. Holotype. Ain Sefra, W. Algeria. F. Werner. T. Barbour. 1928.

Chalcides ocellatus ebneri Werner. See C. o. vittatus var. ebneri Werner

Chalcides ocellatus guttolineata Werner
See C. o. polylepis forma guttolineata Werner

Chalcides ocellatus montanus Werner

1931, Sitz. Akad. Wiss. Wien, **140**, 1, p. 295, pl. ii, fig. 10.

31459–60. 2 Cotypes. Tizi Tamatert, Grand Altas, French Morocco. F. Werner. T. Barbour. 1931.

Chalcides ocellatus ocellatus Forskäl
See Lygosoma (sic) akeleyi Meek

CHALCIDES OCELLATUS POLYLEPIS FORMA GUTTOLINEATA Werner=
C. O. GUTTOLINEATA Werner

1931, Sitz. Akad. Wiss. Wien, **140**, **1**, p. 294, pl. ii, fig. 9.

31462. Cotype. Chella, nr. Rabat, French Morocco. F. Werner. T. Barbour. 1931.

31463. Cotype. Taza, nr. Rabat, French Morocco. F. Werner. T. Barbour. 1931.

31464. Cotype. Fez, nr. Rabat, French Morocco. F. Werner. T. Barbour. 1931.

CHALCIDES OCELLATUS SUBTYPICUS Werner

1931, Sitz. Akad. Wiss. Wien, **140**, **1**, p. 293, pl. iii, fig. 1.

31451–3. 2 Cotypes. Debdou to Taourirt, French Morocco. F. Werner. T. Barbour 1931.

31452. Cotype. Oglat Cedra, French Morocco. F. Werner. T. Barbour. 1931.

31458. Cotype. Taourirt, French Morocco. F. Werner. T. Barbour. 1931.

CHALCIDES OCELLATUS VITTATUS var. EBNERI Werner=
C. O. EBNERI Werner

1931, Sitz. Akad. Wiss. Wien, **140**, **1**, p. 296, pl. ii, fig. 8.

31461. Holotype. Fez, French Morocco. F. Werner. T. Barbour. 1931.

CHAMAELEO BARBOURI Hechenbleikner

1942, Proc. New England Zoöl. Club, **19**, p. 103

7758. Type. Madagascar. Exch. Senckenberg Mus. 1910.

45505. Paratype. Madagascar. Exch. Senckenberg Mus. 1910.

CHAMAELEO DILEPIS IDJWIENSIS Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 363, pl. v, fig. 2.

47155. Type. Upper Mulinga River, Idjwi Id., Lake Kivu, Belgian Congo. A. Loveridge. Mus. Exped. 1939.

47156–65. Paratypes. Upper Mulinga River, Idjwi Id., Lake Kivu, Belgian Congo. A. Loveridge. Mus. Exped. 1939.

CHAMAELEON BITAENIATUS ALTAEELGONIS Loveridge

1935, Bull. Mus. Comp. Zoöl., **79**, p. 15.

40274. Type. Kaburomi, Mt. Elgon, 10,500 feet, Uganda. A. Loveridge. Mus. Exped. 1934.

40275–300. 50 Paratypes. Kaburomi, Mt. Elgon, 10,500 feet, Uganda. A. Loveridge. Mus. Exped. 1934.

CHAMAELEON INCORNUTUS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 380.

31350. Type. Madehani, Ukinga Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

31351–5. 7 Paratypes. Madehani, Ukinga Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

31356–9. 4 Paratypes. Nyamwanga, Poroto Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

31360–4. 5 Paratypes. Nkuka Forest, Rungwe Mtn., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

CHAMAELEON LATERISPINIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 381.

31386. Type. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

31387. Paratype. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

CHAMAELEON WERNERI Tornier

See CHAMAELEON WERNERI DABAGAE Loveridge

CHAMAELEON WERNERI DABAGAE Loveridge = C. WERNERI Tornier

1932, Bull. Mus. Comp. Zoöl., **72**, p. 379.

31344. Type. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

31345–8. 4 Paratypes. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

CHIROMANTIS MACROPS Ahl = C. PETERSI KELLERI Boettger

1929, Zool. Anz., **80**, p. 29.

17625. Cotype. Ganda Ali, Annia Galla, Ethiopia. Erlanger & Neumann. Exch. Berlin Mus. 1932.

CHIROMANTIS PETERSI KELLERI Boettger. See C. MACROPS Ahl

CHERSINELLA SCHONLANDI Hewitt=TESTUDO VERROXII A. Smith

1934, Ann. Natal Mus., **7**, p. 303, pl. xvi, figs. 46-50.

42222–4. 3 Paratypes. Steinkop, Cape Province, Union of South Africa. C. G. S. de Villiers. Exch. Stellenbosch Univ. 1936.

CHERSYDRUS GRANULATUS LUZONENSIS Loveridge

1938, Proc. Biol. Soc. Washington, **51**, p. 209.

25608. Holotype. Laguna de Bay, Luzon, Philippine Ids. E. H. Taylor. T. Barbour. 1927.

CNEMASPIS AFRICANUS ELGONENSIS Loveridge

1936, Proc. Zool. Soc. London, 1935, p. 820.

40870. Paratype. Ngenge, Mt. Elgon, Uganda. A. Loveridge. Mus. Exped. 1934.

40873. Type. Sipi, Mt. Elgon, Uganda, A. Loveridge. Mus. Exped. 1934.

40871–2. 40874–5. 4 Paratypes. Sipi, Mt. Elgon, Uganda. A. Loveridge. Mus. Exped. 1934.

CNEMASPIS BOULENGERI Strauch
See GONATODES GLAUCUS M. A. Smith

CNEMASPIS NIGRIDUS M. A. Smith

1925, Sarawak Mus. Journ., **3**, p. 22.

39024. Paratype. Mt. Gadin, Lunda, Borneo. M. A. Smith. T. Barbour. 1935.

CNEMIDOPHORUS ANGUSTICEPS Cope

1877, Proc. American Philos. Soc., **17**, p. 95.

46945. Cotype. Yucatan, Mexico. A. Schott. Exch. U. S. Nat. Mus. 1944.

A synonym of *C. sexlineatus gularis* (Baird & Gerard) *fide* Burt, 1931, Bull. 154, U. S. Nat. Mus., p. 98.

CNEMIDOPHORUS DECEMLINEATUS Hallowell

1860, Proc. Acad. Nat. Sci. Philadelphia, p. 482.

46944. Cotype. Nicaragua. C. Wright. Exch. U. S. Nat. Mus. 1944.

A synonym, or possibly a race of *C. deppii* Wiegmann, 1834.

CNEMIDOPHORUS GULARIS VELOX Springer=
C. SEXLINEATUS PERPLEXUS Baird & Girard

1928, Copeia, p. 102.

37208. Holotype. Lee's Ferry, Arizona. S. H. Springer. J. Piatt. 1934.

CNEMIDOPHORUS LEMNISCATUS GAIGEI Ruthven=
C. L. LEMNISCATUS Daudin

1915, Occ. Papers Mus. Zool. Univ. Michigan, No. 16, p. 1, pl. i.

6558. Paratypes. La Palomina, Sta. Marta Mtns., Colombia. W. W. Brown. O. Bangs. 1898.

6570. Paratypes. La Palomina, Sta. Marta Mtns., Colombia. W. W. Brown. O. Bangs. 1898.

6571. Paratypes. La Palomina, Sta. Marta Mtns., Colombia. W. W. Brown. O Bangs. 1898.

CNEMIDOPHORUS LEMNISCATUS LEMNISCATUS Daudin
See C. L. GAIGEI Ruthven

CNEMIDOPHORUS LEMNISCATUS PICTA (Van Denburgh & Slevin)
See VERTICARIA PICTA Van Denburgh & Slevin

CNEMIDOPHORUS MEXICANUS BALSAS Gadow=
CNEMIDOPHORUS SEXLINEATUS GULARIS Baird & Girard

1906, Proc. Zool. Soc. London, p. 363.

28670. Cotype. Cuernavaca, Basin of the Balsas River, Mexico. Exch. British Mus. 1929.

CNEMIDOPHORUS MURINUS RUTHVENI Burt

1935, Occ. Papers Mus. Zool. Univ. Michigan, No. 324, p. 1.

27551. Paratype. Seroe, Grandi, Bonaire Id., Dutch West Indies. H. B. Baker. Exch. Michigan Mus. 1929.

CNEMIDOPHORUS PUNCTILINEALIS Dickerson=
CNEMIDOPHORUS TESSELLATUS TESSELLATUS (Say)

1919, Bull. Am. Mus. Nat. Hist., **41**, p. 475.

14305. Paratype. San José de Guaymas, Mexico. W. W. Brown Col. J. E. Thayer. 1919.

CNEMIDOPHORUS SEXLINEATUS GULARIS Baird & Girard
See CNEMIDOPHORUS MEXICANUS BALSAS Gadow

CNEMIDOPHORUS SEXLINEATUS PERPLEXUS Baird & Girard
See C. GULARIS VELOX Springer

CNEMIDOPHORUS TESSELLATUS AETHIOPS Cope

1900, Ann. Rep. U. S. Nat. Mus. for 1898, p. 582 (part, including type).

46946. Cotype. Hermosillo, Sonora, Mexico. Jenkins & Evermann. Exch. U. S. Nat. Mus. 1944.

A synonym of *C. t. tessellatus* (Say) *fide* Burt, 1931, Bull. 154, U. S. Nat. Mus., p. 151, but recognized by some recent writers.

CNEMIDOPHORUS TESSELLATUS TESSELLATUS (Say)
See C. PUNCTILINEALIS Dickerson

COLEONYX VARIEGATUS ABBOTTI Klauber

1945, Trans. San Diego Soc. Nat. Hist., **10**, p. 154.

45721. Paratype. Cerros Island, Lower California, Mexico. J. R. Slevin. California Acad. Sci. 1940.

COLEONYX VARIEGATUS BOGERTI Klauber

1945, Trans. San Diego Soc. Nat. Hist., **10**, p. 176.

6364. 2 Paratypes. Florence, Pinal Co., Arizona. E. A. Browne. E. A. Browne. 1890.

15510–1. 2 Paratypes. Tucson, Pima Co., Arizona. J. R. Slevin. Exch. California Acad. Sci. N. D.

42400. 1 Paratype. Tucson, Pima Co., Arizona. J. A. Griswold, Jr. Mus. Exped. 1937.

43976. 1 Paratype. Tucson, Pima Co., Arizona. T. Barbour. T. Barbour. 1938.

COLEONYX VARIEGATUS PENINSULARIS Klauber

1945, Trans. San Diego Soc. Nat. Hist., **10**, p. 161.

37210. Type. La Paz, Lower California, Mexico. M. L. Cornejo. T. Barbour. 1933.

COLEONYX VARIEGATUS SONORIENSIS Klauber

1945, Trans. San Diego Soc. Nat. Hist., **10**, p. 162.

48768–9. 2 Paratypes. 5-15 miles s. e. of Hermosillo, Sonora, Mexico. Morrow Allen. Exch. Univ. Mich. Mus. Zoöl. 1945.

COLEONYX VARIEGATUS UTAHENSIS Klauber

1945, Trans. San Diego Soc. Nat. Hist., **10**, p. 171.

48788–90. 3 Paratypes. Watercress Springs, Washington Co., Utah. Ross Hardy. Exch. Ross Hardy. 1945.

48791. Paratype. St. George, Washington Co., Utah. Ross Hardy. Exch. Ross Hardy. 1945.

COLOBODACTYLUS TAUNAYI Amaral

1933, Mem. Inst. Butantan, **7**, p. 70, figs 41–45.

37394. Paratype. Las Bernado, Sao Paulo, Brazil. Bicego. Exch. Inst. Butantan. 1934.

COLOPUS KALAHARICUS FitzSimons = C. WAHLBERGII Peters

1932, Ann. Transvaal Mus., **15**, p. 36.

33471–2. 2 Paratypes. Kaotwe Pan, Bechuanaland. Vernay & Lang. Exch. Field Mus. 1932.

COLUBER ALGIRUS INTERMEDIUS Werner

1929, Sitz. Akad. Wiss. Wien, **138**, **1**, p. 6, pl. iv, fig. 6.

27496. Holotype. Ain Sefra, West Algeria. F. Werner. T. Barbour. 1928.

COLUBER CANTORIS Boulenger = ELAPHE CANTORIS (Boulenger)

1894, Cat. Snakes Brit. Mus., **2**, p. 35.

28646. Cotype. Khasi Hills, India. J. Hooker. Exch. British Mus. 1929.

COLUBER RHODORACHIS Jan

1865, in De Filippi, Viagg. in Persia, p. 256.

902. ?Type. Arabia. Capt. C. Millett. Essex Inst., Salem. 1861.

COLUBER SMITHI (Boulenger)
See CORONELLA SEMIORNATA FUSCOROSEA Loveridge

COLUBER VARIABILIS (Boulenger). See ZAMENIS VARIABILIS Boulenger

CONIOPHANES FISSIDENS ANDRESENSIS Bailey

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 362, p. 4.

31867. Holotype. San Andre Id., off Nicaragua, Colombia. J. Zetek. T. Barbour. 1931.

CONIOPHANES IMPERIALIS COPEI Hartweg & Oliver

1938, Occ. Papers Mus. Zool. Univ. Michigan, No. 390, p. 4.

46508–9. 2 Paratypes. Mtns vic. La Mixtequilla, Oaxaca, Mexico. Hartweg & Oliver. Exch. Michigan Mus. 1942.

CONIOPHANES SCHMIDTI Bailey

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 362, p. 1.

22065. Paratype. Chichen Itzá, Yucatan. O. Ricketson. O. Ricketson. 1925.

46510. Paratype. Chichen Itzá, Yucatan. K. McKay. Exch. Michigan Mus. 1942.

CONSTRICTOR CONSTRICTOR AMARALI Stull

1932, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 27.

16700. Holotype. São Paulo, Brazil. A. do Amaral. A. do Amaral. 1922.

COPHIXALUS ORNATUS (Fry). See PHRYNIXALUS REGINAE Anderson

CORDYLUS SPP. See under ZONURUS

Coronella semiornata fuscorosea Loveridge= Coluber smithi (Boulenger)

1935, Bull. Mus. Comp. Zoöl., **79**, p. 8.

40554. Paratype. Tsavo, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40555. Type. Mt. Mbololo, Teita, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40556–7. Paratypes. Mt. Mbololo, Teita, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

Crinia darlingtoni Loveridge

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 57.

18390. Type. MacPherson Range, Queensland. P. J. Darlington. Harvard Australian Exped. 1932.

18391–2. 2 Paratypes. MacPherson Range, Queensland. P. J. Darlington. Harvard Australian Exped. 1932.

Crinia glauerti Loveridge

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 57.

18420. Type. Mundaring Weir, nr. Perth, Western Australia. P. J. Darlington. Harvard Australian Exped. 1931.

18421–2. 2 Paratypes. Mundaring Weir, nr. Perth, Western Australia. P. J. Darlington. Harvard Australian Exped. 1931.

Crocodylus palustris kimbula Deraniyagala

1936, Ceylon Journ. Sci. (B), **19**, p. 280, figs. 1-2, plates xxxii-xxxiii.

42176. Paratype. Ceylon. Exch. Colombo Mus. 1936.

42178. Paratype. Dambura, Western Province, Ceylon. P. Deraniyagala. Exch. Colombo Mus. 1936.

42180. Paratype. Galatabendi, Northwestern Province, Ceylon. P. Deraniyagala. Exch. Colombo Mus. 1936.

The first two specimens listed are only skins, the third is an alcoholic juvenile, the one figured in plate xxxii, fig. 1.

Crossodactylodes pintoi Cochran

1938, Proc. Biol. Soc. Washington, **51**, p. 41.

25707. Paratype. Maché, Est. Rio de Janeiro, Brazil. Museu Paulista. Exch. U. S. Nat. Mus. 1944.

CROSSODACTYLUS AENEUS L. Müller

1924, Senckenbergiana, **6**, p. 171.

17736. Paratype. Barreira, Sierra dos Orgaes, Rio de Janeiro, Brazil. E. Bresslau. Exch. Munich Mus. 1932.

CROTALUS CERASTES LATEROREPENS Klauber

1944, Trans. San Diego Soc. Nat. Hist., **10**, p. 94, pl. v, fig. 2.

47295. Paratype. Benson's Dry Lake, San Diego Co., California. James Deuel. L. M. Klauber. 1945.

CROTALUS CONFLUENTUS LUTOSUS Klauber=
C. VIRIDIS LUTOSUS Klauber

1930, Trans. San Diego Soc. Nat. Hist., **6**, p. 100, p. x, fig. 1.

39674. Paratype. 10 miles N. W. of Abraham, Millard Co., Utah. C. B. Perkins. Exch. L. M. Klauber. 1935.

CROTALUS CONFLUENTUS NUNTIUS Klauber=
C. VIRIDIS NUNTIUS Klauber

1935, Trans. San Diego Soc. Nat. Hist., **8**, p. 78, pl. viii.

39675. Paratype. Diablo Canyon, Coconino Co., Arizona. R. L. Borden. Exch. L. M. Klauber. 1935.

CROTALUS VIRIDIS LUTOSUS Klauber
See C. CONFLUENTUS LUTOSUS Klauber

CROTALUS VIRIDIS NUNTIUS Klauber
See C. CONFLUENTUS NUNTIUS Klauber

CROTAPHOPELTIS SHREVEI Loveridge

1932, Proc. Biol. Soc. Washington, **45**, p. 83.

32471. Holotype. Missao de Dondi, Bella Vista, Angola. K. H. Prior. Exch. Alberta Univ. 1932.

CRYPTOBLEPHARUS BOUTONII DEGRIJSI Mertens=
ABLEPHARUS B. DEGRIJSI (Mertens)

1928, Zool. Anz., **78**, p. 83.

29164. Paratype. Anjouan Id., Comoro Is. A. Voeltzkow. Exch. Senckenberg Mus. 1930.

CRYPTOBLEPHARUS BOUTONII MAYOTTENSIS Mertens=
ABLEPHARUS B. MAYOTTENSIS (Mertens)

1928, Zool. Anz., **78**, p. 83.

37204. Paratype. Mayotte Id., Comoro Is. A. Voeltzkow. T. Barbour. 1933.

CRYPTOBLEPHARUS BOUTONII NOVOCALEDONICUS Mertens=
ABLEPHARUS B. NOVOCALEDONICUS (Mertens)

1928, Zool. Anz., **78**, p. 88.

27939. Paratype. Hiengliene, New Caledonia. Sarasin & Roux. Exch. Basel Museum. 1929.

Burt (1928) suggests that this is a synonym of *poecilopleurus* Wiegmann.

CRYPTOBLEPHARUS BOUTONII RENSCHI Mertens=
ABLEPHARUS B. RENSCHI (Mertens)

1928, Senckenbergiana, **10**, p. 230.

31910. Paratype. Kambaniroe nr. Waingapoe, Sumba Id. R. Mertens. Exch. Senckenberg Mus. 1931.

CRYPTOBLEPHARUS BOUTONII SUMBAWANUS Mertens=
ABLEPHARUS B. SUMBAWANUS (Mertens)

1928, Zool. Anz., **78**, p. 85.

29165. Paratype. Sumbawa-Besar, Dutch East Indies. R. Mertens. Exch. Senckenberg Mus. 1930.

CTENOSAURA SIMILIS MULTIPUNCTATA Barbour & Shreve

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, pl. 197.

36830. Holotype. Old Providence Id., Colombia. J. C. Greenway, Jr., A. V. Armour Exped. 1933.

CYCLORHAMPHUS GRANULOSUS Lutz

1929, Mem. Inst. Oswaldo Cruz, **22**, pp. 19, 22, pl. iii, figs. 3-4.

25711. Cotype. Bonito, Serra da Bocaine, São Paulo, Brazil. (A. Lutz). Exch. U. S. Nat. Mus. 1944.

CYCLURA CARINATA BARTSCHI Cochran

1931, Journ. Washington Acad. Sci., **21**, p. 40.

38182. Paratype. Booby Cay, E. of Mariguana Cay, Bahamas. P. Bartsch. Exch. U. S. Nat. Mus. 1934.

DARLINGTONIA HAETIANA Cochran

1935, Proc. Boston Nat. Hist. Soc., **40**, p. 375.

38252. Holotype. Roche Croix, Massif de la Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

DENDRASPIS JAMESONI KAIMOSAE Loveridge=
DENDROASPIS J. KAIMOSAE (Loveridge)

1936, Proc. Biol. Soc. Washington, **49**, p. 64.

40743. Type. Kaimosi, Kakamega, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40744–8. 5 Paratypes. Kaimosi, Kakamega, Kenya Colony . A. Loveridge. Mus. Exped. 1934.

DENDROASPIS JAMESONI KAIMOSAE (Loveridge)
See DENDRASPIS J. KAIMOSAE Loveridge

DENDROBATES MINUTUS MINUTUS Shreve

1935, Occ. Papers Boston Soc. Nat. Hist. **8**, p. 212.

15288. Type. Barro Colorado Id., Canal Zone. E. R. Dunn. E. R. Dunn. 1929.

16016. 2 Paratypes. Nicensa, San Blas, Panama Republic. T. E. Snyder. T. E. Snyder. 1929.

DENDROBATES MINUTUS VENTRIMACULATUS Shreve

1935, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 213.

19684–90. 18 Paratypes. Pastaza River between Canelos & Marãnon River, Ecuador. C. Spencer. T. Barbour. 1933.

19734. Type. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1933.

19735–41. 7 Paratypes. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1933.

DENDROPHIDION CLARKII Dunn

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 78.

34878. Holotype. El Valle de Antón, Panama Republic. E. R. Dunn. E. R. Dunn. 1933.

DENDROPHIDION VINITOR H. M. Smith

1941, Proc. Biol. Soc. Washington, **54**, p. 74.

9561. Paratype. Matagalpa, Nicaragua. W. B. Richardson. Bt. of W. B. R. 1911.

17117. Paratype. Matagalpa, Nicaragua. W. B. Richardson. Bt. of W. B. R. 1911.

19342. Paratype. Suretka, Costa Rica. Dunn & Duryea. T. Barbour. 1923.

19344. Paratype. La Loma Mtns., Panama Republic. Dunn & Duryea. T. Barbour. 1923.

42782–3. 2 Paratypes. Pequina-Esperanza Ridge, Panama Republic. H. C. Clark. T. Barbour. 1937.

DENDROPHIS BOIGA INTERMEDIA (Mertens)
See AHAETULLA BOIGA INTERMEDIA Mertens

DESMOGNATHUS AUREATAGULUS Weller=D. FUSCUS IMITATOR Dunn

1920, Proc. Jun. Soc. Nat. Hist. Cincinnati, 1, p. 3.

17541–5. 5 Paratypes. Newfoundland Gap, 4400–4600 ft., North Carolina-Tennessee line. W. H. Weller. Exch. Junior Soc. Nat. Hist. Cincinnati. 1932.

DESMOGNATHUS QUADRAMACULATUS AMPHILEUCUS Bishop

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 451, p. 12.

25796. Paratype. Demorest, Habersham Co., Georgia. M. E. Phillips. Exch. S. C. Bishop. 1944.

DESMOGNATHUS WRIGHTI King

1936, Herpetologica, 1, p. 57.

20943–4. 2 Paratypes. Mt. Le Conte, Sevier Co., Tennessee. W. King. Exch. U. S. Nat. Mus. 1937.

DINODON FLAVOZONATUM Pope

1928, Amer. Mus. Novit., No. 325, p. 2.

45962–3. 2 Paratypes. Chungan Hsien, Yenping, China. C. H. Pope. Exch. American Mus. 1941.

DIPSOSAURUS DORSALIS SONORIENSIS Allen

1933, Occ. Papers Mus. Zool. Univ. Michigan, No. 259, p. 4.

46517–8. 2 Paratypes. S. E. Hermosillo, Sonora, Mexico. Morrow Allen. Exch. Michigan Mus. 1942.

DROMICUS ANGUSTILINEATUS Schmidt & Walker

1943, Zool. Series Field Mus. Nat. Hist., **24**, p. 308.

45907. Paratype. 45908. Type. Toquepala Mine, 60 km. East of Moquegua, Dept. Tacna, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1941.

DROMICUS PARVIFRONS ROSAMONDAE Cochran=
LEMADOPHIS P. ROSAMONDAE (Cochran)

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 186.

37668. Type. Isle Vache, Haiti. T. Barbour. T. Barbour. 1934.
37669–72. 4 Paratypes. Isle Vache, Haiti. T. Barbour. T. Barbour. 1934.

DROMICUS TACHYMENOIDES Schmidt & Walker

1943, Zool. Series Field Mus. Nat. Hist., **24**, p. 309.

45940. Paratype. Toquepala Mine, Tacna Dept., Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1940.

DRYADOPHIS ALTERNATUS ALTERNATUS (Bocourt)
See EUDRYAS BODDAERTI GAIGEAE Stuart

DRYADOPHIS BODDAERTI RUTHVENI (Stuart)
See EUDRYAS RUTHVENI Stuart

DRYADOPHIS MELANOLOMUS TEHUANAE H. M. Smith

1943, Proc. U. S. Nat. Mus., **93**, p. 420.

46865. Paratype. Tres Cruces, Oaxaca, Mexico. H. M. Smith. Exch. U. S. Nat. Mus. 1944.

ECPLEOPUS LUTZAE Loveridge

1944, Proc. Biol. Soc. Washington, **57**, p. 97.

46991. ♀ Cotype. In bromeliads at about 3,500 feet, above Beija. Flor River, Theresopholis, Rio de Janeiro, Brazil. Dr. Bertha Lutz-Dr. B. Lutz. 1944.

EDALORHINA PUSTULATA Shreve

1941, Proc. New England Zoöl. Club, **18**, p. 80.

7666. Holotype. Guayaquil, Ecuador. C. T. Brues. C. T. Brues. 1913.

EGERNIA CARINATA H. M. Smith

1939, Field Mus. Nat. Hist. Zool. Series, **24**, p. 11.

45594. Paratype. Toolbrunup, Western Australia. J. Baldwin. Exch. Field Mus. 1940.

EGERNIA INORNATA Rosén. See E. STRIATA Sternfeld
EGERNIA STRIATA Sternfeld = E. INORNATA Rosén

1919, Senckenbergiana, **1**, p. 79.

33525–6. 2 Cotypes. Hermannsburg, Finke River, Central Australia. M. Leonhardi. Exch. Senckenberg Mus. 1932.

ELACHISTOCLEIS OVALIS (Schneider)
See HYPOPACHUS PEARSEI Ruthven

ELAPHE CANTORIS (Boulenger). See COLUBER CANTORIS Boulenger

ELAPHE QUADRIVITTATA DECKERTI Brady

1932, Proc. Biol. Soc. Washington, **45**, p. 5.

21934. Paratype. Lower Matacumbe Key, Florida. J. N. Farnum. J. N. Farnum. 1929.

29322. Paratype. Lower Matacumbe Key, Florida. J. N. Farnum. J. N. Farnum. 1930.

ELAPHE QUADRIVITTATA PARALLELA Barbour

1942, Proc. New England Zoöl. Club, **20**, p. 103, pl. xvii.

46468. Holotype. Sam Windsor's Lump, Carteret Co., N. Carolina. W. L. Engels. W. L. Engels. 1942.

ELAPHE QUATTUORLINEATA PRAEMATURA Werner

1935, Sitz. Akad. Wiss. Wien, **144**, **1**, p. 111, fig. 5.

38523. Paratype. Tos Id., Cyclades, Greece. F. Werner. T. Barbour. 1935.

ELAPHE WILLIAMSI Barbour & Carr

1940, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 340.

45705. Type. Nr. Lebanon, Levy Co., Florida. Harold Williams. T. Barbour. 1940.

45706-7. 2 Paratypes. Nr. Lebanon, Levy Co., Florida. Harold Williams. T. Barbour. 1940.

ELAPS FULVIUS BARBOURI Schmidt
= MICRURUS F. BARBOURI (Schmidt)

1928, Bull. Antivenin Inst. Amer. (Philadelphia), **2**, p. 64.

13658. Type. Paradise Key, Dade Co., Florida. T. Barbour. T. Barbour. 1920.

ELAPSOIDEA SUNDEVALLII FITZSIMONSI Loveridge

1944, Bull. Mus. Comp. Zoöl., **95**, p. 229.

46795. Paratype. Gomodimo Pan, Kalahari Desert, Bechuanaland Protectorate. H. Lang. Exch. Field Mus. Nat. Hist. 1943.

ELEUTHERODACTYLUS ACUMINATUS Shreve

1935, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 217.

19949–50. 2 Paratypes. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1933.

19951. Type. Canelos, Oriente, Ecuador. O. C. Felton. T. Barbour. 1932

ELEUTHERODACTYLUS ALBIPES Barbour & Shreve

1937, Bull. Mus. Comp. Zoöl., **80**, p. 383.

21960. Paratype. Nr. Cueva del Aura, Pico Turquino, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22015–8. 4 Paratypes. Cueva del Aura to Pico Cuba, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22045. Type. Pico Turquino, 5400–6000 ft., Oriente, Cuba. P. J. Darlington,. Mus. Exped. 1936.

22046–9. 16 Paratypes. Pico Turquino, 5400–6000 ft., Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

ELEUTHERODACTYLUS ALTICOLA Lynn

1937, Herpetologica, **1**, p. 89, pl. viii, fig. 2.

22363. Paratype. Blue Mtn. Peak, St. Thomas Parish, Jamaica. W. G. Lynn. Exch. U. S. Nat. Mus. 1937.

ELEUTHERODACTYLUS ANDREWSI Lynn

1937, Herpetologica, **1**, p. 88, pl. viii, fig. 2.

22364. Paratype. Clydesdale, Jamaica. W. G. Lynn. Exch. U. S. Nat. Mus. 1937.

ELEUTHERODACTYLUS ARMSTRONGI Noble & Hassler

1933, Amer. Mus. Novit., No. 652, p. 2.

24547–8. 2 Paratypes. Nr. Barahona, Dominican Republic. W. G. Hassler. Exch. American Mus. 1941.

ELEUTHERODACTYLUS ATKINSI ORIENTALIS Barbour & Shreve

1937, Bull. Mus. Comp. Zoöl., **80**, p. 382.

3882. Paratype. La Patana, nr. Baracoa, Cuba. V. J. Rodriguez. C. de la Torre. 1915.

4073. Paratype. La Patana, nr. Baracoa, Cuba. V. J. Rodriguez. T. Barbour. 1916.

22070–4. 7 Paratypes. El Yunque de Baracoa, Cuba. P. J. Darlington. Mus. Exped. 1936.

22092–8. 7 Paratypes. Cape Maisi, Oriente, Cuba. P. J. Darlington Mus. Exped. 1936.

22101–3. 3 Paratypes. Mtns. N. of Imias, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22158. Type. Upper Ovando River, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22159. Paratype. Upper Ovando River, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

ELEUTHERODACTYLUS AUDANTI Cochran

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 164.

19704. Type. La Selle Peak, Haiti. A. Audant. T. Barbour. 1934.

19705–10. 6 Paratypes. La Selle Peak, Haiti. A. Audant. T. Barbour. 1934.

ELEUTHERODACTYLUS BAKERI Cochran

1935, Proc. Boston Nat. Hist. Soc., **40**, p. 369.

19837. Type. Mt. La Hotte, 5000–7800 ft., Haiti. P. J. Darlington. Mus. Exped. 1934.

19838–41. 19843–45. 21562–68. 14 Paratypes. Mt. La Hotte, 5000–7800 ft., Haiti. P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS BREVIROSTRIS Shreve

1936, Proc. New England Zoöl. Club, **15**, p. 95.

21557. 21558–60. Type and 3 Paratypes. N. & E. foothills, Massif de la Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

21573. Paratype. 5000–7000 ft., Massif de la Hotte, Haiti, P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS CARMELITAE Ruthven

1922, Mus. Zool. Univ. Michigan, Misc. Publ., No. 8, p. 51, pl. xi, fig. 1, pl. xii, fig. 1.

8979. Paratype. Quebrada Viernes Santo, 5000 ft., San Lorenzo, Santa Marta Mtns., Colombia. A. G. Ruthven. Exch. Michigan Mus. 1922.

ELEUTHERODACTYLUS COCHRANAE Grant

1933, Journ. Dept. Agric. Puerto Rico, **16**, p. 325.

18603–21. 19 Cotypes. Hassel Id., nr. St. Thomas Id., Virgin Is. C. Grant. T. Barbour. 1933.

The author designates a numbered type from St. John and then proceeds to describe the species on the basis of "Co-types" from St. John and Hassel Id.

ELEUTHERODACTYLUS DARLINGTONI Cochran

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 368.

19847. Type. Near La Visite, La Selle Range, Haiti. P. J. Darlington. Mus. Exped. 1934.

19848–50. 3 Paratypes. Near La Visite, La Selle Range, Haiti. P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS DORSOCONCOLOR Taylor

1942, Univ. Kansas Sci. Bull., **27**, p. 152.

25713. Paratype. Tequeyutepec, Veracruz, Mexico. Hobart M. Smith. Exch. U. S. Nat. Mus. 1944.

ELEUTHERODACTYLUS FEMUR-LEVIS Cochran

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 371.

19836. Holotype. Desbarriere, Mt. de la Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS GAIGEI (Dunn). See LITHODYTES GAIGEI Dunn

ELEUTHERODACTYLUS GLANDULIFER Cochran

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 367.

19851. Holotype. N. & E. foothills of Mt. La Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS GLANDULIFEROIDES Shreve

1936, Proc. New England Zoöl. Club, **15**, p. 96.

21597. Type. Nr. La Visite, La Selle Range, Haiti. P. J. Darlington Mus. Exped. 1934.

21598. Paratype. Nr. La Visite, La Selle Range, Haiti. P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS INTERMEDIUS Barbour & Shreve

1937, Bull. Mus. Comp. Zoöl., **80**, p. 384.

21965. Type. Nr. Cueva del Aura, Pico Turquino, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

21966–74. 13 Paratypes. Nr. Cueva del Aura, Pico Turquino, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22050. Paratype. 5400–6000 ft. on Pico Turquino, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22130–2. 3 Paratypes. Mtns. N. of Imias, 3000–4000 ft., Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22157. Paratype. Sierra Maestra, Cobre Range, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

ELEUTHERODACTYLUS JUGANS Cochran, 1937

NOM. NOV. FOR LEPTODACTYLUS DARLINGTONI Cochran, 1935

1937, Journ. Washington Acad. Sci., **27**, p. 312.

ELEUTHERODACTYLUS LEWISI Lynn & Dent

1942, Herpetologica, **2**, p. 72, figs.

25714. Paratype. Dolphin Head, Near Bush Mtn., Westmoreland, Jamaica. W. G. Lynn. Exch. U. S. Nat. Mus. 1944.

ELEUTHERODACTYLUS MATUDAI Taylor

1942, Univ. Kansas Sci. Bull., **27**, p. 154.

25715. Paratype. Mt. Ovando, Chiapas, Mexico. H. M. Smith. Exch. U. S. Nat. Mus. 1944.

ELEUTHERODACTYLUS MEGALOPS Ruthven

1917, Occ. Papers Mus. Zool. Univ. Michigan, No. 39, p. 3, pl. i, figs. 1-2.

4755–6. 2 Paratypes. Cincinnati, Colombia. F. M. Gaige. Exch. Michigan Mus. 1917.

8981–2. 2 Paratypes. Sta. Marta Mtns., Colombia. A. G. Ruthven. Exch. Michigan Mus. 1922.

ELEUTHERODACTYLUS MILESI Schmidt

1933, Field Mus. Nat. Hist. Zool. Series, **20**, p. 18.

17435–6. 2 Paratypes. Mtns. W. of San Pedro, Honduras Republic. K. P. Schmidt. Exch. Field Mus. 1931.

ELEUTHERODACTYLUS MONNICHORUM Dunn

1940, Proc. Acad. Nat. Sci. Philadelphia, **92**, p. 107.

10051–6. 6 Paratypes. Gutierrez, Bocas del Toro, Panama Republic. E. R. Dunn. T. Barbour. 1923.
These are part of the "seven tiny specimens at Gutierrez" mentioned by Dunn.

ELEUTHERODACTYLUS ORCUTTI Dunn

1928, Proc. U. S. Nat. Mus., **74**, Art. 22, p. 1.

25717. Paratype. Arntully, St. Thomas Parish, Jamaica. C. R. Orcutt. Exch. U. S. Nat. Mus. 1944.

ELEUTHERODACTYLUS PARVUS Barbour & Shreve

1937, Bull. Mus. Comp. Zoöl., **80**, p. 386.

21947. Type. Cueva del Aura, Pico Turquino, Cuba. P. J. Darlington. Mus. Exped. 1936.

21948–59. 12 Paratypes. Cueva del Aura, Pico Turquino, Cuba. P. J. Darlington. Mus. Exped. 1936.

ELEUTHERODACTYLUS PICTISSIMUS Cochran

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 371.

19846. Holotype. Tardieu, N. E. foothills of Mt. la Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS POOLEI Cochran

1938, Proc. Biol. Soc. Washington, **51**, p. 93.

25718. Paratype. Citadel of King Christophe, Haiti. A. J. Poole. Exch. U. S. Nat. Mus. 1944.

ELEUTHERODACTYLUS PSEUDOACUMINATUS Shreve

1935, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 218.

19948. Holotype. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1933.

ELEUTHERODACTYLUS RANOIDES EMLENI Dunn
See E. R. NUBICOLA Dunn & Emlen

ELEUTHERODACTYLUS RANOIDES NUBICOLA Dunn & Emlen = E. R. EMLENI Dunn

1932, Proc. Acad. Nat. Sci., Philadelphia, **34**, p. 23.

17615. Paratype. San Juancito, Honduras Republic. J. T. Emlen. Exch. Philadelphia Acad. 1932.

As *E. r. nubicola* Dunn & Emlin, 1932, was preoccupied by *E. nubicola* Dunn, 1926, the latter renamed the species *E. r. emleni* in 1932, Copeia, p. 97.

ELEUTHERODACTYLUS RUFIFEMORALIS Noble & Hassler

1933, Amer. Mus. Novit., No. 652, p. 4.

24549–50. 2 Paratypes. Ravine above Salvacion Station, nr. Barahona, Dominican Republic. W. G. Hassler. Exch. American Mus. 1941.

ELEUTHERODACTYLUS SCHMIDTI RUCILLENSIS Cochran

1939, Proc. New England Zoöl. Club, **18**, p. 3.

23300. Type. Loma Rucilla, Dominican Republic. P. J. Darlington. Mus. Exped. 1938.

ELEUTHERODACTYLUS SEMIPALMATUS Shreve

1936, Proc. New England Zoöl. Club, **15**, p. 94.

21561. Holotype. N. & E. foothill, Massif de la Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

ELEUTHERODACTYLUS STADELMANI Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 44.

21290. Type. Portillo Grande, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

21291. Paratype. Sta. Marta, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

ELEUTHERODACTYLUS TALAMANCAE Dunn

1931, Occ. Papers Boston Soc. Nat. Hist., **5**, p. 385.

9785–7. 3 Paratypes. Suretka, Costa Rica. E. R. Dunn. T. Barbout. 1920.

9879. Type. Almirante, Bocas del Toro, Panama Republic. Dunn & Duryea. T. Barbour. 1923.

9882–3. 2 Paratypes. Almirante, Bocas del Toro, Panama Republic. Dunn & Duryea. T. Barbour. 1923.

9971–5. 5 Paratypes. La Loma, Bocas del Toro, Panama Republic. Dunn & Duryea. T. Barbour. 1923.

7949–52. 4 Paratypes. Monteverde, Costa Rica. E. R. Dunn. T. Barbour. 1920.

8040. 1 Paratype. Zent, Costa Rica. E. R. Dunn. T. Barbour. 1920.

ELEUTHERODACTYLUS TURQUINENSIS Barbour & Shreve

1937, Bull. Mus. Comp. Zoöl., **80**, p. 380.

21975. Type. Nr. Cueva del Aura, Pico Turquino, Oriente, Cuba P. J. Darlington. Mus. Exped. 1936.

21976–84. 30 Paratypes. Nr. Cueva del Aura, Pico Turquino Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

ELEUTHERODACTYLUS VENTRILINEATUS (Shreve)
See LEPTODACTYLUS VENTRILINEATUS Shreve

EMOIA FLAVIGULARIS Schmidt

1932, Field Mus. Nat. Hist. Zool. Series, **18**, p. 185.

32193. Paratype. Tunnibuli, Ysabel Id., Solomon Is. K. P. Schmidt. Exch. Field Mus. 1931.

EMOIA KUEKENTHALI (Boettger)
See LYGOSOMA KUEKENTHALI Boettger

EMOIA SANFORDI Schmidt & Burt

1930, Amer. Mus. Novit., No. 436, p. 1.

19609. Paratype. Ambrym, New Hebrides. Speiser. Exch. Basle Mus. 1924.

ENYGRUS ASPER SCHMIDTI Stull

1932, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 26.

29778. Type. Kaiserin Sepik, Augusta River, New Guinea. Gillerup. Exch. Zool. Mus. Amsterdam. 1931.

EPICRATES CENCHRIA GAIGEI Stull

1938, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 298.

46502. Paratype. Dept. Sta. Cruz, Bolivia. J. Steinbach. Exch. Michigan Mus. 1942.

EPICRATES INORNATUS GRANTI Stull

1933, Occ. Papers Mus. Zool. Univ. Michigan, No. 267, p. 1.

33947. Holotype. Tortola Id., Porto Rico. C. Grant. T. Barbour. 1933.

EPICRATES STRIATUS FOSTERI Barbour

1941, Proc. New England Zoöl. Club, **18**, p. 64.

46054. Type. Nr. Alicetown, N. Bimini Id., Bahamas. Foster & Huntingdon. Foster & Huntingdon. 1941.

46055–9. 46178. 6 Paratypes. Nr. Alicetown, N. Bimini Id., Bahamas. Foster & Huntingdon. Foster & Huntingdon. 1941.

EPICRATES STRIATUS RELICQUUS Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 362.

37891. Holotype. Sheep Cay, Great Inagua Id., Bahamas. J. C. Greenway, Jr. T. Barbour. 1934.

EREMIAS MULTIOCELLATA SATURATA Blanford
See E. YARKANDENSIS VAR. SATURATA Blanford

EREMIAS MULTIOCELLATA YARKANDENSIS Blanford
See. E. YARKANDENSIS Blanford

EREMIAS YARKANDENSIS Blanford
=E. MULTIOCELLATA YARKANDENSIS Blanf.

1875, Journ. Asiatic Soc. Bengal, **44**, p. 194.

7167. Cotype. Yarkand, Chinese Turkestan. F. Stoliczka. Exch. Indian Mus. 1908.

EREMIAS YARKANDENSIS VAR. SATURATA Blanford
= E. MULTIOCELLATA SATURATA Blanford

1875, Journ. Asiatic Soc. Bengal, **44**, p. 195.

7168. Cotype. Kuenluen Valley, south of Yarkand, Chinese Turkestan. F. Stoliczka. Exch. Indian Mus. 1908.

ERYTHROLAMPRUS AESCULAPII IMPAR Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 49.

38765. Holotype. Mataderos Mtns., Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

ERYTHROLAMPRUS MIMUS MICRURUS Dunn & Bailey

1939, Bull. Mus. Comp. Zoöl., **86**, p. 12.

18848. Paratype. France Field, Canal Zone. Barbour, Brooks & Wigglesworth. T. Barbour. 1924.

24957. Paratype. Juan Mina, Canal Zone. J. Zetek. T. Barbour. 1927.

31828. Type. Cana Mines, Panama Republic. H. C. Clark. T. Barbour. 1938.

32724–7. 4 Paratypes. Andagoya, Choco, Colombia. W. H. White. W. H. White. 1929.

37887. Paratype. France Field, Canal Zone. J. B. Shropshire. T. Barbour. 1933.

ERYX COLUBRINA LOVERIDGEI Stull
See ERYX THEBAICUS LOVERIDGEI Stull

ERYX THEBAICUS LOVERIDGEI Stull
= E. COLUBRINA LOVERIDGEI Stull

1932, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 29, pl. ii, fig. A.

7295. Paratype. Uganda. T. Barbour.

11486. Paratype. Nairobi, Kenya Colony. F. R. Wulsin. F. R. Wulsin. 1915.

18184. Type. Mbuyuni, Kenya Colony. A. Loveridge. T. Barbour 1916.

Mbuyuni, not Mbunyi, is the correct rendering of the type locality, and F. R. Wulsin, not A. Loveridge, the collector of M. C. Z. 11486.

EUDRYAS BODDAERTI GAIGEAE Stuart
= DRYADOPHIS A. ALTERNATUS (Bocourt)

1933, Occ. Papers Mus. Zool. Univ. Michigan, No. 254, p. 7.

46504. Paratype. Boquete, Chiriqui Province, Panama Republic. H. T. Gaige. Exch. Michigan Mus. 1942.

EUDRYAS RUTHVENI Stuart
= DRYADOPHIS BODDAERTI RUTHVENI (Stuart)

1933, Occ. Papers Mus. Zool. Univ. Michigan, No. 254, p. 4.

6521. 6544–7. 5 Paratypes. La Concepcion, Colombia. W. W. Brown. O. Bangs. 1899.

6554–5. 6575. 6577. 4 Paratypes. Palomina, Sta. Marta region, Colombia. W. W. Brown. O. Bangs. 1899.

46505. Paratype. San Lorenzo, Santa Marta Mtns., Colombia. A. S. Pearse. Exch. Michigan Mus. 1942.

EUMECES INDUBITUS Taylor

1934, Univ. Kansas Sci. Bull., **21**, p. 258, pls. xxiv-xxv.

37715. Paratype. Nr. Ascension, W. Mexico. Taylor & Smith. Exch. E. H. Taylor. 1933.

EUMECES LATISCUTATUS OKADAE Stejneger

1907, U. S. Nat. Mus. Bull. No. 58, p. 200, fig. 181.

46953. Paratype. Nii shima, Idzu Seven Islands, Japan. N. Okada. Exch. U. S. Nat. Mus. 1944.

EUMECES OCHOTERANAE Taylor

1933, Proc. Biol. Soc. Washington, **46**, p. 129.

37716. Paratype. Mazatlan, Guerrero, Mexico. Taylor & Smith. Exch. E. H. Taylor. 1933.

EUMECES TUNGANUS Stejneger

1924, Journ. Acad. Sci. Washington, **14**, p. 384.

46955. Paratype. Zuting Kias, Hsikiang, 5000–6000 feet, China. D. C. Graham. Exch. U. S. Nat. Mus. 1944.

EUPEMPHIX RUTHVENI Netting

1930, Ann. Carnegie Mus., **19**, p. 167, pl. vii, fig. 1.

15698. Paratype. Matamoco, Santa Marta Mtns., Colombia. A. G. Ruthven. Exch. Michigan Mus. 1930.

EUPEMPHIX SCHERERI Myers

1942, Proc. Biol. Soc. Washington, **55**, p. 151.

25598. Paratype. Pevas, Ampiyacu River, Peru. P. Scherer. Exch. Stanford Univ. Mus. 1943.

EUPREPES (EUPREPIS) ISSELII Peters = MABUYA ISSELII (Peters)

1871, Monatsb. Akad. Wiss. Berlin, p. 567.

37207. Cotype. Keren, Boguslande, Ethiopia. Issel & Doria. T. Barbour. 1933.

Is likely to prove a recognizable northeast African race of *M. varia*.

EURYCEA GRISEOGASTER Moore & Hughes

1941, Copeia, p. 139.

25527–8. 2 Paratypes. Swimmer's Creek, Illinois River, Sequoyah Co., Oklahoma. Dutton, Hallock, Moore & Seamster. Moore & Hughes. 1942.

25534. 2 Paratypes. Swimmer's Creek, Illinois River, Sequoyah Co., Oklahoma. Dutton, Hallock, Moore & Seamster. Exch. Michigan Mus. 1942.

EURYCERA LONGICAUDA PERNIX Mittleman

1942, Proc. New England Zoöl. Club, **21**, p. 101, pl. xx.

25569. Type. Jimmie Strahl Creek, State Park, Brown Co., Indiana M. B. Mittleman. Exch. M. B. Mittleman. 1942.

25570–4. 5 Paratypes. Jimmie Strahl Creek, State Park, Brown Co., Texas. C. E. Mohr. Exch. S. C. Bishop. 1942.

EURYCERA NANA Bishop

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 451, p. 9, pl. i, fig. 1.

25580–1. 2 Paratypes. Lake at head of San Marcos River, Hayes Co., Texas. C. E. Mohr. Exch. S. C. Bishop. 1942.

EURYCERA NEOTENES Bishop & Wright

1937, Proc. Biol. Soc. Washington, **50**, p. 142, fig.

22350. Paratype. 5 miles N. of Helotes, Texas. S. C. Bishop. S. C. Bishop. 1937.

EURYCEA TYNERENSIS Moore & Hughes

1939, Amer. Midl. Nat. (Notre Dame), **22**, p. 697, figs. 1–2.

25530–2. 3 Cotypes. Tyner Creek, Proctor, Adair Co., Oklahoma. Moore & Mizelle. Moore & Hughes. 1942.

25533. 3 Cotypes. Tyner Creek, Proctor, Adair Co., Oklahoma. Moore & Mizelle. Exch. Michigan Mus. 1942.

EUSPONDYLUS MARIANUS (Ruthven)
See PRIONODACTYLUS MARIANUS Ruthven

GASTROTHECA BOLIVIANA GRISWOLDI Shreve

1941, Proc. New England Zoöl. Club, **18**, p. 82.

24102. Type. Maraynioc, Dept. Junin, Peru. J. A. Griswold, Jr. J. A. Griswold, Jr. 1937.

24103–6. Paratypes. Maraynioc, Dept. Junin, Peru. J. A. Griswold, Jr. J. A. Griswold, Jr. 1937.

In addition there are series of paratypes from several other localities as listed by the original describer.

GEKKO OORTI Kopstein

1926, Zool. Med. (Leiden), **9**, p. 77.

38970. 39721. 2 Paratypes. Teun Id., Banda Sea. F. Kopstein. Exch. Leyden Mus. 1935.

GEOEMYDA SPENGLERI SINENSIS Fan=G. S. SPENGLERI (Gmelin)

1931, Bull. Dept. Biol. Coll. Sci. Sun Yatsen Univ. (Canton), No. 11, p. 146.

32425. Paratype. Lo-shiang, Kwangsi, China. Kwechow Exped. Exch. Sun Yatsen Univ. 1932.

The reasons for regarding *sinensis* as a synonym have been enumerated by Pope, 1935, The Reptiles of China, p. 35.

GEOEMYDA SPENGLERI SPENGLERI (Gmelin)
See G. SPENGLERI SINENSIS Fan

GEOPHIS DUNNI Schmidt

1932, Copeia, p. 8.

31870. Holotype. Matagalpa, Nicaragua. E. stomach of *Micrurus* W. B. Richardson.

GEOPHIS SEMIANNULATUS H. M. Smith

1941, Proc. New England Zoöl. Club, **18**, p. 49.

11422. Holotype. Colima, Mexico. G. Glückert. G. Glückert. 1913.

GEOTRYPETES SERAPHINI OCCIDENTALIS Parker

1936, Zool. Meded. (Leiden), **19**, p. 99.

23554. Cotype. Oubasi, S. Ashanti, Gold Coast. H. G. F. Spurrell. Exch. British Mus. 1938.

GEPHYROMANTIS DECARYI Angel=MANTIDACTYLUS DECARYI (Angel)

1931 (1930), Bull. Soc. Zool. France, **55**, p. 549.

17459. Cotype. Midongy du Sud, Farafangana Prov., Madagascar. R. Decary. Exch. Paris Mus. 1932.

GERRHOSAURUS FLAVIGULARIS FITZSIMONSI Loveridge

1942, Bull. Mus. Comp. Zoöl., **89**, p. 514.

13532–3. 2 Paratypes. Morogoro, Tanganyika Territory. A. Loveridge. T. Barbour. 1920.

17983. Paratype. Loita Plains, Kenya Colony. C. P. Curtis. C. P. Curtis. 1923.

29656. Paratype. Mazeras, Kenya Colony. E. Heller. Exch. U. S. Nat. Mus. 1930.

29657. Paratype. Voi, Kenya Colony. E. Heller. Exch. U. S. Nat. Mus. 1930.

41275–7. 3 Paratypes. Voi, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

41280. Type. Mt. Mbololo, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

41281–2. 2 Paratypes. Mt. Mbololo, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

41283. Paratype. Ngatana, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

41284. Paratype. Golbanti, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

GLAUCONIA MERKERI Werner=
=LEPTOTYPHLOPS CONJUNCTA CONJUNCTA (Jan)

1909, Jahr. Ver. Natk. Württemburg (Stuttgart), **65**, p. 61.

31627. Cotype. Moshi, Tanganyika Territory. Merker. Exch. Stuttgart Mus. 1931.

The description of *merkeri* was faulty.

GLAUERTIA RUSSELLI Loveridge

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 89.

19424–9. 6 Paratypes. Creek flowing into Gascoyne River, Mt. Landor Stn., Western Australia. L. Glauert. Exch. W. Australia Mus. 1933.

GONATODES GLAUCUS M. A. Smith=CNEMASPIS BOULENGERII Strauch

1920 (1921), Journ. Nat. Hist. Soc. Siam, **4**, p. 95, pl. -, fig. 3.

39014–23. 21 Paratypes. Pulo Condore off Cochin China coast, China Sea. M. A. Smith. T. Barbour. 1935.

GONIOCEPHALUS SCHODEI Vogt. See GONYOCEPHALUS SCHODEI Vogt

GONYOCEPHALUS SCHOEDEI Vogt=GONIOCEPHALUS SCHODEI Vogt

1932, Sitz. Ges. Naturf. Freunde Berlin, p. 282.

37201. Cotype. Jesus Maria, Lambussa Id., Dutch New Guinea. Schoede. T. Barbour. 1933.

GRAPTEMYS BARBOURI Carr and Marchand

1942, Proc. New England Zoöl. Club, **20**, p. 98.

46251. Type. Chipola River, Jackson Co., Florida. A. F. Carr, Jr. T. Barbour. 1941.

46252–301. 49 Paratypes. Chipola River, Jackson Co., Florida. A. F. Carr, Jr. T. Barbour. 1941.

GRAPTEMYS PSEUDOGEOGRAPHICA VERSA Stejneger

1925, Journ. Washington Acad. Sci., **15**, p. 463.

42346. Paratype. Austin, Texas. H. H. & C. S. Brimley. Exch. U. S. Nat. Mus. 1936.

GYMNODACTYLUS ANGULARIS M. A. Smith

See G. PEGUENSIS VAR. ANGULARIS M. A. Smith

GYMNODACTYLUS BREVIPALMATUS M. A. Smith

1923, Journ. Nat. Hist. Soc. Siam, **6**, p. 48, pl. v, fig. 1.

39037. Cotype. Khao Luang, Nakon Sritamarat Mtns., Siam. M. A. Smith. T. Barbour. 1935.

GYMNODACTYLUS CONDORENSIS M. A. Smith

1921, Journ. Nat. Hist. Soc. Siam, **4**, p. 94, pl. –, fig. 1.

39038–9. 2 Paratypes. Pulo Condore, off Cochin China coast, China Sea. M. A. Smith. T. Barbour. 1935.

GYMNODACTYLUS CONSPICUUS Amaral

1933, Mem. Inst. Butantan, **7**, p. 57, figs. 9-10.

37393. Paratype. Villa Nova, Bahia, Brazil. E. Garbe. Exch. Inst. Butantan. 1934.

GYMNODACTYLUS INTERMEDIUS M. A. Smith

1917, Journ. Nat. Hist. Soc. Siam, **2**, p. 221, pl. –, fig. 2.

39040. Cotype. Khao Sebab, Chantabun, S. E. Siam. M. A. Smith. T. Barbour. 1935.

GYMNODACTYLUS IRREGULARIS M. A. Smith

See G. PEGUENSIS VAR. IRREGULARIS M. A. Smith

GYMNODACTYLUS PEGUENSIS VAR. ANGULARIS M. A. Smith

=G. ANGULARIS M. A. Smith

1921, Proc. Zool. Soc. London, p. 427, fig. 1C.

39044. Paratype. Dong Paya Fai Mtns., E. Siam. M. A. Smith. T. Barbour. 1935.

The habitat is given as Dong Rek Mountains, Eastern Siam.

GYMNODACTYLUS PEGUENSIS VAR. IRREGULARIS M. A. Smith
= G. IRREGULARIS M. A. Smith

1921, Proc. Zool. Soc. London, p. 428, fig. 1B.

39043. Paratype. Camly, Langbian Plateau, S. Annam. M. A. Smith. T. Barbour. 1935.

GYRINOPHILUS PORPHYRITICUS DURYI (Weller)
See PSEUDOTRITON DURYI Weller

GYRINOPHILUS PORPHYRITICUS INAGNOSCUS Mittleman

1942, Proc. New Eng. Zoöl. Club, **20**, p. 27, pl. vi, fig. F.

25526. Paratype. Salt Creek, 4 miles S.W. of Bloomingville, Good Hope Twn., Hocking Co., Ohio. M. B. Mittleman. M. B. Mittleman. 1942.

HAIDEOTRITON WALLACEI Carr

1939, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 333.

19875. Holotype. Albany, Dougherty Co., Georgia. Hummel. A. F. Carr, Jr. 1939.

HELICOPS PASTAZAE Shreve

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 129.

36993. Type. Pastaza River between Canelos and Marañon River, Ecuador. C. Spencer. T. Barbour. 1932.

36994–8. 5 Paratypes. Pastaza River between Canelos and Marañon River, Ecuador. C. Spencer. T. Barbour. 1932.

An error of printing gives the type as No. 36,963 and paratype as 36,944.

HELIOPORUS EYREI (Gray). See H. INSULARIS Loveridge

HELIOPORUS INSULARIS Loveridge = H. EYREI (Gray)

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 92.

18198–202. 5 Paratypes. Rottnest Id., Western Australia. P. J. Darlington. Harvard Australian Exped. 1931.

HEMIDACTYLUS GARDINERI Boulenger
See also H. PERSIMILIS Barbour & Loveridge and H. MANDANUS Loveridge

1909, Trans. Linn. Soc. London **12**, p. 296, pl. xi, fig. 4.

28652. Cotype. Farquhar Group, Seychelle Is. S. Gardiner. Exch. British Mus. 1929.

HEMIDACTYLUS LEIGHTONI Boulenger. See H. NEOTROPICALIS Shreve

HEMIDACTYLUS MANDANUS Loveridge=H. GARDINERI Boulenger

1936, Proc. Biol. Soc. Washington, **49**, p. 60.

39995. Holotype. Manda Id., Kenya Colony. A. Loveridge. Mus. Exped. 1934.

HEMIDACTYLUS NEOTROPICALIS Shreve=H. LEIGHTONI Boulenger

1936, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 270.

39706. Holotype. Puerto Wilches, Santander Dept., Colombia. R. E. Stadelman. T. Barbour. 1935.

The locality as given in the original description was erroneous and was later corrected by the author (1938, Herpetologica, **1**, p. 124) who was informed by the collector that he had dropped the gecko, without labeling it, into a can of material from Curumani.

HEMIDACTYLUS PARKERI Loveridge=H. PUCCIONII CALABRESI.

1936, Proc. Biol. Soc. Washington, **49**, p. 59.

22976. Holotype. Zanzibar. C. Cooke. Mus. Exped. 1862.

Doubtless imported by a dhow trading from Somaliland. In a recent paper Parker (1942, Bull. Mus. Comp. Zoöl., **91**, p. 27) suggests that *puccionii* is a juvenile *H. turcicus*, but we are inclined to think that it is a synonym of another species, the type of which, however, will require reexamination before a decision is reached.

HEMIDACTYLUS PUCCIONII CALABRESI. See H. PARKERI Loveridge

HEMIDACTYLUS TANGANICUS Loveridge

1929, U. S. Nat. Mus. Bull. 151, p. 42, pl. i.

18253. Holotype. Dutumi, nr. Kisaki, Tanganyika Territory. A. Loveridge. T. Barbour. 1932.

HEMIDACTYLUS TAYLORI Parker

1932, Proc. Zool. Soc. London, p. 342.

33595. Paratype. Sol Haud, 2700 ft., British Somaliland. R. H. R. Taylor. Exch. British Mus. 1932.

HEMIDACTYLUS TROPIDOLEPIS BARBOURI Loveridge

1942, Bull. Mus. Comp. Zoöl., **91**, p. 320, fig.

40907. Type. Changamwe, opp. Kilindini Harbour, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

26649–50. 30447. 47323–8. 9 Paratypes. Likoni, opp. Kilindini Harbour, Kenya Colony. A. Loveridge. Mus. Exped. 1927. 1930. 1939.

47320–2. 3 Paratypes. Siga Caves, nr. Tanga, Tanganyika Territory. A. Loveridge. Mus. Exped. 1939.

HEMITHECONYX TAYLORI Parker

1930, Ann. Mag. Nat. Hist. (10), **6**, p. 603.

38544–5. 2 Paratypes. Sol Haud, 3000 ft., British Somaliland. R. H. R. Taylor. Exch. British Mus. 1935.

HOMOPHOLIS WAHLBERGII ARNOLDI Loveridge

1944, Proc. Biol. Soc. Washington, **57**, p. 1.

12581. Type. Mahalapsi River, Bechuanaland Protectorate. F. Dally. Exch. Nat. Mus. S. Rhodesia. 1919.

HYLA ALBOFRENATA Lutz

1926, Trab. Inst. Oswaldo Cruz, pp. 7, 14.

25695. Cotype. Sumare, Corcovado, Rio de Janeiro, Brazil. (A. Lutz.) Exch. U. S. Nat. Mus. 1944.

Hyla altae Dunn

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 61.

17972. Type. Summit, Canal Zone. E. R. Dunn. E. R. Dunn. 1932.

Hyla anceps Lutz

1929, Comptes Rendus Soc. Biol. (Rio), **101**, p. 943.

15850. Cotype. Estrella, Rio de Janeiro, Brazil. A. Lutz. Exch. Inst. Oswaldo Cruz. 1930.

Hyla angularis Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 54.

25891. Type. Mount Wilhelm, 5000–8000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

Hyla becki Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 55.

25900. Type. Mount Wilhelm, 7000–10,000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

25901–9. 39 Paratypes. Mount Wilhelm, 7000–10,000 ft. Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

Hyla bromeliacea Schmidt

1933, Field Mus. Nat. Hist. Zool. Series, **20**, p. 19.

17431–2. 2 Paratypes. Mtns. of San Pedro, Honduras Republic. K. P. Schmidt. Exch. Field Mus. 1931.

21301. Paratype. Mtns. behind Ceiba, Honduras Republic. R. E. Stadleman. T. Barbour. 1935.

21302–3. 2 Paratypes. Mtns. of Sta Ana, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

Besides the first two specimens listed above, the author refers to "two additional specimens . . . in the Museum of Comparative Zoölogy," actually there were three.

Hyla brongersmai Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 56.

15203. Type. Parana Valley, central Dutch New Guinea. D. P. Wirz. Exch. Basel Mus. 1929.

Hyla colymba Dunn

1931, Occ. Papers Boston Soc. Nat. Hist., **5**, p. 400.

10234. Type. La Loma, Panama Republic. Dunn & Duryea. T. Barbour. 1925.

10233,5. 2 Paratypes. La Loma, Panama Republic. Dunn & Duryea. T. Barbour. 1925.

10236–43. ? Tadpoles. La Loma, Panama Republic. Dunn & Duryea. T. Barbour. 1925.

Hyla culex Dunn & Emlen

1932, Proc. Acad. Nat. Sci. Philadelphia, **84**, p. 24.

16098. Type. Tela, Honduras Republic. R. E. Stadelman. T. Barbour. 1930.

Hyla darlingtoni Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 53.

25890. Type. Mount Wilhelm, 5000–8000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

Hyla evelynae Schmidt

1944, Zool. Series Field Mus. Nat. Hist., **29**, p. 156, fig. 21.

27561. Paratype. Alvarez, 15 km. northeast of San Carlos, Uruguay. K. P. Schmidt. Exch. Chicago Mus. 1944.

Hyla fuscovaria Lutz

1926, Mem. Inst. Oswaldo Cruz., **19**, p. 7.

15851–2. 2 Cotypes. Rio de Janeiro, Brazil. A. Lutz. Exch. Inst. Oswaldo Cruz. 1930.

HYLA LAFRENTZI Mertens & Wolterstorff

1929, Zool. Anz., **84**, p. 235.

17702. Paratype. Desierto de los Leones, N. Mexico. K. Lafrentz. Exch. Senckenberg Mus. 1932.

HYLA LEUCOPHYLLATA SARAYACUENSIS Shreve

1935, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 215.

19729. Type. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1933.

19730. Paratype. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1933.

HYLA LOQUAX Gaige & Stuart

1934, Occ. Papers Mus. Zool. Univ. Michigan, No. 281, p. 1.

19754. 21456. 2 Paratypes. N. of La Libertad, Guatemala. L. C. Stuart. Exch. Michigan Mus. 1932 and 1935.

HYLA MEGAPODIA Mirando-Ribeiro

1926, Arch. Mus. Nac. (Rio de Janeiro), **27**, (no text), pl. v, fig. 5.

15668. Cotype. Matto Grosso, Brazil. Mus. Nac. de Rio Janeiro. 1930.

HYLA PARKERI Gaige

1929, Occ. Papers Mus. Zool. Univ. Michigan, No. 207, p. 1.

15566–70. 16467–72. 11 Paratypes. Buenavista, Dept. Sta. Cruz, Bolivia. J. Steinbach. Exch. Michigan Mus. 1929.

HYLA PEARSONI Gaige

1929, Occ. Papers Mus. Zool. Univ. Michigan, No. 207, p. 3.

15565. Paratype. Upper Beni below mouth of Mapiri, Bolivia. N. E. Pearson. Exch. Michigan Mus. 1929.

HYLA PICADOI Dunn

1937, Copeia, p. 163.

16002. Type. Volcan Barba, Costa Rica. E. R. Dunn. E. R. Dunn. 1930.

HYLA RUEPPELLI Boettger

1895, Zool. Anz. **18**, p. 137.

17703–4. 2 Paratypes. Kau, N. Halmahera. W. Kükenthal. Exch. Senckenberg Mus. 1932.

HYLA SANBORNI Schmidt

1944, Zool. Series Field Mus. Nat. Hist., **29**, p. 155, fig. 20.

25535. Paratype. Hacienda Alvarez nr. San Carlos, Uruguay. K. P. Schmidt. Exch. Michigan Mus. 1942.

HYLA SPINIPOLLEX Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 45.

21300. Holotype. Mtns. behind Ceiba, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

HYLA STADELMANI Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 45.

21310. Type. Subirana Valley, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

21311. Paratype. Subirana Valley, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

HYLA URUGUAYA Schmidt

1944, Zool. Series Field Mus. Nat. Hist., **29**, p. 158, fig. 22.

25762. Paratype. Quebrada de los Cuervos, Dept. of Trienta y Tres, Uruguay. K. P. Schmidt. Exch. Chicago Mus. 1944.

HYLA WRIGHTORUM Taylor

1939 (1938), Univ. Kansas Sci. Bull., **25**, p. 436, pl. xlvii, fig. 1.

25536. Paratype. David Lee Lake, Catron Co., New Mexico. J. T. Cantrall. Exch. Michigan Mus. 1942.

HYLA ZETEKI Gaige

1929, Occ. Papers Mus. Zool. Univ. Michigan, No. 207, p. 4.

15571. Paratype. Boquete, Chiriqui Province, Panama Republic. H. T. Gaige. Exch. Michigan Mus. 1929.

HYLAMBATES COCHRANAE Loveridge

1941, Proc. U. S. Nat. Mus., **91**, p. 125.

24465. Cotype. Bandaja, Liberia. W. M. Mann. Exch. U. S. Nat. Mus. 1941.

HYLAMBATES LEBEAUI Witte = LEPTOPELIS LEBEAUI (Witte)

1933, Revue Zool. Bot. Afr., **24**, p. 102.

21674. Paratype. Tembwe Katanga, Belgian Congo. H. Schouteden. Exch. Congo Mus. 1936.

HYLAMBATES RUFUS VAR. MODESTA Werner = LEPTOPELIS MODESTUS (Werner)

1898, Verh. Ges. Zool. Bot. Wien, **48**, p. 197.

17621. Cotype. Victoria, British Cameroons. Preuss. Exch. Berlin Mus. 1932.

This frog was received as a cotype of *modesta*, but in Werner's paper no locality, other than tadpoles from Togo, is given for var. *modesta* whereas var. *boulengeri* came from Victoria, Cameroons, Preuss coll., but was based on a single specimen with which this does not agree. At the same time the museum received a faded frog from Victoria, also Preuss coll., labeled *boulengeri*.

HYLARTHROLEPTIS ELBERTI Ahl = PHRYNOBATRACHUS ELBERTI (Ahl)

1925, Sitz. Ges. Naturf. Freunde Berlin, 1923, p. 101.

17538. Cotype. Buala, Uam River, French Cameroon. Elbert. Exch. Berlin Mus. 1932.

Hyloxalus panamensis Dunn

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 69.

19209. Type. El Valle de Antón, Panama Republic. E. R. Dunn. E. R. Dunn. 1933.

19210–4. 5 Paratypes. El Valle de Antón, Panama Republic. E. R. Dunn. E. R. Dunn. 1933.

Hymenochirus boulengeri Witte

1930, Revue Zool. Bot. Afr., **19**, p. 167, footnote.

14856–9. 2164–8. 9 Paratypes. Koteli, nr. Buta, Bas Uele, Belgian Congo. G. F. de Witte. Exch. Congo Mus. 1928 and 1936.

Hyperolius adametzi Ahl

1931, Das Tierreich, No. 55, p. 295, fig. 171.

17626. Cotype. Bamenda, Cameroons. Adametz. Exch. Berlin Mus. 1932.

The Zoological Record cites Mitt. Zool. Mus. Berlin, **17**, pp. 1–132 for the description of this and some ninety other members of the genus described by Ahl. Actually as Das Tierreich appeared in March and the Mitteilungen on April 1 the former has precedence. In the case of adametzi it was misspelled *ademetzi* in the Mitteilungen (p. 37), the collector being given as Adametz on p. 38, and on our label.

Hyperolius ahli Loveridge

1936, Bull. Mus. Comp. Zoöl., **79**, p. 402.

20682. Type. Peccatoni, nr. Witu, Kenya Colony. A .Loveridge. Mus. Exped. 1934.

20683–4. 2 Paratypes. Peccatoni, nr. Witu, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

20685–9. 5 Paratypes. Nr. Witu, Kenya Colony. A. Loveridge Mus. Exped. 1934.

20690–4. 5 Paratypes. Golbanti, Tana River, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

20695–7. 3 Paratypes. Malindi, Seydie Province, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

And a few additional paratypes from four other localities.

HYPEROLIUS ARGENTOVITTUS Ahl. See H. CALLICHROMUS Ahl

HYPEROLIUS BAUMANNI Ahl

1931, Das Tierreich, No. 55, p. 291, fig. 167.

17627. Cotype. Misahöhe, Togoland. C. Baumann. Exch. Berlin Mus. 1932.

HYPEROLIUS BITAENIATUS Ahl

1931, Das Tierreich, No. 55, p. 322, fig. 196.

17628. Cotype. Konde-Nyika, Tanganyika Territory. F. Fülleborn. Exch. Berlin Mus. 1932.

HYPEROLIUS BREVICEPS Ahl = H. UNDULATUS (Boulenger)

1931, Das Tierreich, No. 55, p. 316, fig. 190.

17629. Cotype. Eldama Ravine Station, Kenya Colony. H. Grote. Exch. Berlin Mus. 1932.

HYPEROLIUS CALLICHROMUS Ahl = H. ARGENTOVITTIS Ahl

1931, Das Tierreich, No. 55, p. 372, fig. 248.

17630–1. 2 Cotypes. W. Bank of Upper Russisi River, Belgian Congo. R. Grauer. Exch. Berlin Mus. 1932.

HYPEROLIUS CONCOLOR (Hallowell). See H. MAXIMUS Ahl

HYPEROLIUS DECIPIENS Ahl

1931, Das Tierreich, No. 55, p. 404, fig. 280.

17633. Cotype. W. of Russisi River, Belgian Congo. R. Grauer. Exch. Berlin Mus. 1932.

HYPEROLIUS DECORATUS Ahl

1931, Das Tierreich, No. 55, p. 352, fig. 227.

17632. Cotype. Longa, Upper Mimesera River, Loanda, Angola. Brühl & Gleim. Exch. Berlin Mus. 1932.

HYPEROLIUS DISCODACTYLUS Ahl

1931, Das Tierreich, No. 55, p. 363, fig. 239.

17634. Cotype. W. of Lake Edward, Belgian Congo. R. Grauer. Exch. Berlin Mus. 1932.

HYPEROLIUS FLAVOGUTTATUS Ahl

1931, Das Tierreich, No. 55, p. 369, fig. 245.

17635. Cotype. Bukoba, Tanganyika Territory. F. Stuhlmann. Exch. Berlin Mus. 1932.

HYPEROLIUS FULLEBORNI Ahl

1931, Das Tierreich, No. 55, p. 349, fig. 224.

17636–7. 2 Cotypes. Rungwe, Tanganyika Territory. F. Fülleborn Exch. Berlin Mus. 1932.

HYPEROLIUS HIEROGLYPHICUS Ahl

1931, Das Tierreich, No. 55, p. 409, fig. 282.

17638. Cotype. Bamenda, Cameroons. Adametz. Exch. Berlin Mus. 1932.

HYPEROLIUS MARGINATUS Peters. See H. PICTUS Ahl

HYPEROLIUS MARIAE Barbour & Loveridge
See H. MELANOPHTHALMUS Ahl

HYPEROLIUS MAXIMUS Ahl = H. CONCOLOR (Hallowell)

1931, Das Tierreich, No. 55, p. 366, fig. 241.

17639. Cotype. Guinea. H. Schlegel. Exch. Berlin Mus. 1932.

HYPEROLIUS MELANOPHTHALMUS Ahl = H. MARIAE Barbour & Loveridge

1931, Das Tierreich, No. 55, p. 341, fig. 215.

17640. Cotype. Zanzibar. Tup. Exch. Berlin Mus. 1932.

HYPEROLIUS MILNEI Loveridge=H. PUSILLUS (Cope)

1935, Bull. Mus. Comp. Zoöl., **79**, p. 18.

20025. Type. Witu, Coast Province, Kenya Colony. A. Loveridge.
20026–50. 50 Paratypes. Witu, Coast Province, Kenya Colony. A. Loveridge. Mus. Exped. 1934.
20051–2. 2 Paratypes. Golbanti, Coast Province, Kenya Colony. A. Loveridge. Mus. Exped. 1934.
20053. 1 Paratype. Malindi, Coast Province, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

HYPEROLIUS MONTANUS (Angel). See RAPPIA MONTANA Angel

HYPEROLIUS MOSSAMBICUS Parker

1931, Proc. Zool. Soc. London, 1930, p. 904, pl. i, fig. 1.

16300. Paratype. Fambani River, Mozambique. H. B. Cott. Exch. British Mus. 1933.

HYPEROLIUS MULTICOLOR Ahl

1931, Das Tierreich, No. 55, p. 367, fig. 243.

17641. Cotype. Bamboo Forest, Mt. Karisimbi, Belgian Ruanda. H. Schuhotz. Exch. Berlin Mus. 1932.

HYPEROLIUS NYASSAE Ahl=H. UNDULATUS (Boulenger)

1931, Das Tierreich, No. 55, p. 339, fig. 213.

17642. Cotype. Rungwe, Tanganyika Territory. F. Fülleborn. Exch. Berlin Mus. 1932.

Misprinted Rugwe in Mitt. Zool. Mus. Berlin, **17**, p. 67, where Ahl regards Tukuyu (Langenburg) specimens as typical, the two localities are 20 miles apart.

HYPEROLIUS PARKERI PARKERI Loveridge

1933, Bull. Mus. Comp. Zoöl., **74**, p. 410.

13365. Type. Dar es Salaam, Tanganyika Territory. A. Loveridge. T. Barbour. 1927.
13366–7. 2 Paratypes. Derema, Usambara Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

17263–73. 10 Paratypes. Bagamoyo, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

Hyperolius parkeri rovumae Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 410, pl. iii, figs. 5-6.

25260. Type. Kitaya, Rovuma River, Tanganyika Territory. A. Loveridge. Mus. Exped. 1939.

25261–9. 9 Paratypes. Kitaya, Rovuma River, Tanganyika Territory. A. Loveridge. Mus. Exped. 1939.

Hyperolius phrynoderma Ahl = H. rossii (Calabresi)

1931, Das Tierreich, No. 55, p. 344, fig. 218.

17643. Cotype. Central Tanganyika Territory. Deutsch-Zentral-Afrika Exped. Exch. Berlin Mus. 1932.

Many of the labels on the German Central African Expedition material were destroyed; the locality given for the type series "Zentrales Deutsch-Ost-Afrika" appears to be taken from the name of the Expedition, and the frogs more probably came from the Central Lake Region where the Expedition did much of its collecting.

Hyperolius pictus Ahl = H. marginatus Peters

1931, Das Tierreich, No. 55, p. 301, fig. 176.

17644–5. 2 Cotypes. Uhehe near Iringa, Tanganyika Territory. W. Goetz. Exch. Berlin Mus. 1932.

Hyperolius poweri Loveridge

1938, Proc. Biol. Soc. Washington, **51**, p. 213.

23110. Type. Stanger, Umvoti River, Natal. J. H. Power. T. Barbour. 1938.

23111–4. 4 Paratypes. Stanger, Umvoti River, Natal. J. H. Power. T. Barbour. 1938.

Unfortunately the author was abroad at the time of publication and the editor added an 'R' to the type locality, making it "Stranger."

Hyperolius pusillus (Cope). See H. translucens Power, and H. usarmoae Loveridge; also H. milnei Loveridge

HYPEROLIUS ROSSII (Calabresi). See H. PHRYNODERMA Ahl

HYPEROLIUS SPATZI Ahl

1931, Das Tierreich, No. 55, p. 406.

17646. Cotype. Bakel to Kadira, Senegal. Spatz. Exch. Berlin Mus. 1932.

HYPEROLIUS SWYNNERTONI FitzSimons

1941, Ann. Transvaal Mus., **20**, p. 280, pl. xii, figs. 1-3.

23311-5. 5 Paratypes. Chirinda Forest, Mt. Silinda, Southern Rhodesia. V. FitzSimons. T. Barbour. 1938.

HYPEROLIUS TRANSLUCENS Power = H. PUSILLUS (Cope)

1935, Proc. Zool. Soc. London, p. 339, figs. 6-7, pl. i, figs. 3-4.

21527-41. 5 Paratypes. Port St. Johns, Cape Province. J. H. Power. Exch. J. H. Power. 1934.

HYPEROLIUS UNDULATUS (Boulenger). See H. BREVICEPS Ahl, and H. NYASSAE Ahl, also RAPPIA UNDULATA Boulenger

HYPEROLIUS USARAMOAE Loveridge = H. PUSILLUS (Cope)

1932, Proc. Biol. Soc. Washington, **45**, pl. lxiii

13363. Type. Dar es Salaam, Tanganyika Territory. A Loveridge. T. Barbour. 1927.

13364. Paratype. Dar es Salaam, Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

HYPEROLIUS VARIABILIS Ahl

1931, Das Tierreich, No. 55, p. 297, fig. 173.

17648. 17652. 2 Cotypes. Bukoba, Tanganyika Territory. Deutsch-Zentral-Afrika Exped. Exch. Berlin Mus. 1932.

HYPOPACHUS CHAMPIONI Stuart

1940, Proc. Biol. Soc. Washington, **53**, p. 19.

25537–9. 3 Paratypes. 1 km. S. of San Geronimo, Baja Verapaz, Guatemala. L. C. Stuart. Exch. Michigan Mus. 1942.

HYPOPACHUS PEARSEI Ruthven = ELACHISTOCLEIS OVALIS (Schneider)

1914, Proc. Biol. Soc. Washington, **27**, p. 77.

3727. 6075. 2 Paratypes. Fundacion, Colombia. A. S. Pearse. Exch. Michigan Mus. 1915 and 1919.

HYPSIGLENA TORQUATA DUNKLEI Taylor

1939 (1938), Univ. Kansas Sci. Bull., **25**, p. 374, pl. xxxvii, fig. 1.

42594. Holotype. Hacienda La Clementina, Tamaulipas, Mexico. D. H. Dunkle. D. H. Dunkle. 1936.

IDIOCRANIUM RUSSELLI Parker

1936, Proc. Zool. Soc. London, p. 162, figs. 6 and 8.

20945–6. 2 Paratypes. Makumunu, Mamfe Division, British Cameroons. I. T. Sanderson. Exch. Cambridge Mus. 1936.

21811–2. 2 Paratypes. Makumunu, Mamfe Division, British Cameroons. I. T. Sanderson. Exch. British Mus. 1936.

IMANTODES SPLENDIDUS OLIVERI H. M. Smith

1942, Proc. U. S. Nat. Mus., **92**, p. 388.

27799. 27801. 2 Paratypes. Tepanatepec, Oaxaca, Mexico. W. W. Brown. T. Barbour. 1927.

27800. Type. Tepanatepec, Oaxaca, Mexico. W. W. Brown, T. Barbour. 1927.

KASSINA DESERTICOLA Ahl

1930, Zool. Anz., **88**, p. 280.

17650. Cotype. Windhuk, South West Africa. L. Scheben. Exch. Berlin Mus. 1932.

KASSINA SENEGALENSIS OVAMBOENSIS Hoffman

1942, Soölogiese Navorsing Nas. Mus. Bloemfontein, **1**, p. 155, figs. 26-27.

25657. Paratype. Oshikango, Ovamboland, South West Africa. V. FitzSimons. Exch. Transvaal Mus. 1943.

KINOSTERNON CREASERI Hartweg

1934, Occ. Papers Mus. Zool. Univ. Michigan, No. 277, p. 1.

46501. Paratype. Hacienda, Chichen Itza, Yucatan. E. Creaser. Exch. Michigan Mus. 1942.

KINOSTERNON FLAVESCENS (Agassiz)
See PLATYTHRYRA FLAVESCENS Agassiz

LACERTA ANDREANSKYI Werner

1929, Sitz. Akad. Wiss. Wien, **138, 1**, p. 4, fig. 1, pl. iii, figs. 1-3.

27391. Holotype. Tachdirt, Grand Atlas, Morocco. G. Andreansky to Werner. T. Barbour. 1928.

LACERTA DUGESII MAULI Mertens

1938, Senckenbergiana, **20**, p. 287, figs. 1-2.

44758. Paratype. Deserta Grande Id., nr. Madeira, Canary Islands. G. Maul. Exch. Senckenberg Mus. 1938.

LACERTA ERHARDI AMORGENSIS Werner

1933, Sitz. Akad. Wiss. Wien, **142, 1**, p. 110, figs. 3-4.

37028–33. 6 Cotypes. Amorgos Id., Cyclades Is. F. Werner. T. Barbour. 1933.

LACERTA ERHARDI RUTHVENI Werner

1930, Occ. Papers Mus. Zool. Univ. Michigan, No. 211, p. 13, pl. iv, figs. 18-22.

46520. Paratype. Skopelos Id., Aegean Sea. F. Werner. Exch. Michigan Mus. 1942.

LACERTA ERHARDI THERMINENSIS Werner

1935, Sitz. Akad. Wiss. Wien, **144**, **1**, p. 96, fig. 1 (part).

38493–500. 8 Paratypes. Kythnos Id., Cyclades, Greece. F. Werner. T. Barbour. 1935.

LACERTA PERSPICILLATA CHABANAUDI Werner

1931, Sitz. Akad. Wiss. Wien, **140**, **1**, p. 286.

29981. Type. Chella, nr. Rabat, French Morocco. F. Werner. T. Barbour. 1931

29982. Paratype. Taza, nr. Rabat, French Morocco. F. Werner. T. Barbour. 1931.

LACERTA PERSPICILLATA PELLEGRINI FORMA RERAHIENSIS Werner= L. P. RERAHIENSIS Werner

1931, Sitz. Akad. Wiss. Wien, **140**, **1**, p. 287, pl. iii, fig. 14.

29983. Holotype. Ol Rerahia, Grand Atlas, French Morocco. F. Werner. T. Barbour. 1931.

LACERTA PERSPICILLATA PELLEGRINI FORMA TAZANA Werner= L. P. TAZANA Werner

1931, Sitz. Akad. Wiss. Wien, **140**, **1**, p. 287, pl. iii, fig. 13.

29984–9. 6 Cotypes. Taza, Morocco. F. Werner. T. Barbour. 1931.

LACERTA PERSPICILLATA PELLEGRINI Werner

1929, Sitz. Akad. Wiss. Wien, **138**, **1**, p. 5, pl. i, fig. 4a.

27390. Holotype. Sefrou, French Morocco. F. Werner. T. Barbour. 1929.

LACERTA PERSPICILLATA RERAHIENSIS Werner
See L. P. PELLEGRINI FORMA RERAHIENSIS Werner

LACERTA PERSPICILLATA TAZANA Werner
See L. P. PELLEGRINI FORMA TAZANA Werner

LACERTA TAURICA GAIGEAE Werner

1930, Occ. Papers Mus. Zool. Univ. Michigan, No. 211, p. 9, pl. i, figs. 4–6, pl. ii, figs. 7-11.

37048–9. 2 Paratypes. Skyros (Scyros) Id., Aegean Sea. F. Werner. T. Barbour. 1933.

46521. 2 Paratypes. Skyros (Scyros) Id., Aegean Sea. F. Werner. Exch. Michigan Mus. 1942.

LAMPROPELTIS GETULUS STICTICEPS Barbour

1942, Proc. New England Zoöl. Club, **20**, p. 101, pl. xvi.

46469. Holotype. The Knoll, Ocracoke Id., N. Carolina. W. L. Engels. W. L. Engels. 1942.

LAMPROPELTIS GETULUS YUMENSIS Blanchard
See L. YUMENSIS Blanchard

LAMPROPELTIS POLYZONA BLANCHARDI Stuart=
L. TRIANGULUM BLANCHARDI Stuart

1934, Occ. Papers Mus. Zool. Univ. Michigan, No. 309, p. 2.

4252. Paratype. Chichen Itza, Yucatan. L. J. Cole. A. Agassiz. 1904.

27853. Paratype. Chichen Itza, Yucatan. J. H. Sandground. Dr. Sandground. 1929.

29242. Paratype. Chichen Itza, Yucatan. G. Shattuck. Dr. Shattuck. 1930.

LAMPROPELTIS TRIANGULUM BLANCHARDI Stuart
See L. POLYZONA BLANCHARDI Stuart

LAMPROPELTIS TRIANGULUM GAIGAE Dunn

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 353, p. 9.

34282. Paratype. Quiel, Chiriqui Province, Panama Republic. Rex Benson. T. Barbour. 1932.

LAMPROPELTIS TRIANGULUM NELSONI Blanchard

1920, Occ. Papers Mus. Zool. Univ. Michigan, No. 81, p. 6, pl. i, fig. 1.

27105. Paratype. Colima, Mexico. J. Xantus. Exch. U. S. Nat. Mus. 1928.

The original number of this specimen was U.S.N.M. 31494.

LAMPROPELTIS YUMENSIS Blanchard =
L. GETULUS YUMENSIS Blanchard

1919, Occ. Papers Mus. Zool. Univ. Michigan, No. 70, p. 6, pl. i, fig. 2.

27107. Paratype. Yuma, Arizona. U. S. Fish Commission. Exch. U. S. Nat. Mus. 1928.

The original number of this specimen was U.S.N.M. 15969.

LATASTIA CAERULEOPUNCTATA Parker = L. LONGICAUDATA Reuss

1935, Ann. Mag. Nat. Hist. (10), **16**, p. 527.

42151. Paratype. Haud, 2100 ft., British Somaliland. R. H. R. Taylor. Exch. British Mus. 1936.

LATASTIA LONGICAUDATA Reuss. See L. CAERULEOPUNCTATA Parker

LATHROGECKO SANCTAE-MARTAE Ruthven =
LEPIDOBLEPHARIS S. SANCTAE-MARTAE (Ruthven)

1916, Occ. Papers Mus. Zool. Univ. Michigan, No. 21, p. 2.

11304. Paratype. Fundacion, Sta. Marta Mtns., Colombia. A. S. Pearse & A. G. Ruthven. Exch. Michigan Mus. 1915.

LEIMADOPHIS PARVIFRONS ROSAMONDAE (Cochran)
See DROMICUS P. ROSAMONDAE Cochran

LEIOCEPHALUS ALTAVELENSIS Noble & Hassler

1933, Amer. Mus. Novit., No. 652, p. 14.

45950–1. 2 Paratypes. Alta Vela Id., Dominican Republic. W. G. Hassler. Exch. American Mus. 1941.

LEIOCEPHALUS CARINATUS ARMOURI Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 360.

6968. Paratype. Grand Bahama Id., Bahamas Bahama Exped. T. Barbour. 1904.

38090. Type. High Rock, Grand Bahamas Id., Bahamas. T. Barbour. T. Barbour. 1934.

38091–108. 18 Paratypes. High Rock, Grand Bahama Id., Bahamas. T. Barbour. T. Barbour. 1934.

LEIOCEPHALUS CARINATUS HELENAE Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 359.

38110. Type. Mira Por Vos, S. Cay, Bahama. T. Barbour. T. Barbour. 1934.

38111–9. 9 Paratypes. Mira Por Vos, S. Cay, Bahamas. T. Barbour. T. Barbour. 1934.

LEIOCEPHALUS CARINATUS PICINUS Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 360.

38120. Type. Atwood's Cay, Bahama. J. C. Greenway, Jr. T. Barbour. 1934.

38121. Paratype. Atwood's Cay, Bahamas. J. C. Greenway, Jr. T. Barbour. 1934.

LEIOCEPHALUS GREENWAYI Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 358.

36711. Type. East Plana Cay, Bahamas. T. Barbour. T. Barbour. 1936.

36712–6. 11 Paratypes. East Plana Cay, Bahamas. T. Barbour. T. Barbour. 1936.

LEIOCEPHALUS LOXOGRAMMUS PARNELLI Barbour & Shreve

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 359.

36748. Holotype. Watling's Id., Bahamas. T. Barbour. T. Barbour. 1933.

LEIOCEPHALUS PERSONATUS AUREUS Cochran

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 175.

37535–8. 4 Paratypes. Jacmel, Haiti. A. Audant. T. Barbour. 1934.

LEIOCEPHALUS PERSONATUS LOUISAE Cochran

1934, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 177.

37551. Type. Saona Id., Dominican Republic. T. Barbour. T. Barbour. 1934.
37552–4. 3 Paratypes. Saona Id., Dominican Republic. T. Barbour. T. Barbour. 1934.

LEIOCEPHALUS PERSONATUS MENTALIS Cochran

1932, Proc. Biol. Soc. Washington, **45**, p. 178.

5443. 2 Paratypes. Puerto Plata, Dominican Republic. M. A. Frazer. Bt. by M. C. Z. 1885.
13679–91. 13 Paratypes. Sosüa, Puerto Plata, Dominican Republic. J. L. Peters. T. Barbour. 1916.

LEIOCEPHALUS PERSONATUS SCALARIS Cochran

1932, Proc. Biol. Soc. Washington, **45**, p. 181.

46918–9. 2 Paratypes. Cap Haitien, Haiti. A. J. Poole. Exch. U. S. Nat. Mus. 1944.

LEIOLOPISMA HAWAIIENSIS Loveridge=
LYGOSOMA (LEIOLOPISMA) HAWAIIENSE (Loveridge)

1939, Proc. Biol. Soc. Washington, **52**, p. 1.

44234. Type. Nr. Honolulu, Oahu, Hawaiian Is. 1939.
44235–7. 3 Paratypes. Wahiawa, Oahu, Hawaiian Is. 1939.

LEIOLOPISMA UNICOLOR (Harlan). See OLIGOSOMA GEMMINGERI Cope

LEPIDOBLEPHARIS SANCTAE-MARTAE SANCTAE-MARTAE (Ruthven)
See LATHROGECKO SANCTAE-MARTAE Ruthven

LEPIDOPHYMA GAIGEAE Mosauer

1936, Herpetologica, **1**, p. 3, pl. ii.

42145. Type. Durango, nr. Jacara, Hidalgo, Mexico. W. Mosauer. T. Barbour. 1936.

42146–8. 3 Paratypes. Durango, nr. Jacara, Hidalgo, Mexico. W. Mosauer. T. Barbour. 1936.

LEPOSOMA PERCARINATUM (L. Müller). See L. TAENIATA Noble

LEPOSOMA TAENIATA Noble=L. PERCARINATUM (L. Müller)

1923, Zoologica (New York), **3**, p. 303.

45956–7. 2 Paratypes. Kartabo, British Guiana. W. Beebe. Exch. American Mus. 1941.

LEPTODACTYLUS DARLINGTONI Cochran, 1935
Renamed ELEUTHERODACTYLUS JUGANS Cochran, 1937

1935, Proc. Boston Soc. Nat. Hist., **40**, p. 372.

19852. Type. Nr. La Visite, La Selle Range, Haiti. P. J. Darlington. Mus. Exped. 1934.

19853–6. 4 Paratypes. Nr. La Visite, La Selle Range, Haiti. P. J. Darlington. Mus. Exped. 1934.

These were also paratypes of *L. darlingtoni* Cochran, a valids pecies subsequently renamed *E. jugans* Cochran as the name *darlingtoni* was already preoccupied in *Eleutherodactylus* by *darlingtoni* Cochran.

LEPTODACTYLUS VENTRILINEATUS Shreve=
ELEUTHERODACTYLUS VENTRILINEATUS (Shreve)

1936, Proc. New England Zoöl. Club, **15**, p. 98.

19857. Type. Mt. La Hotte, 5000–7000 ft., Haiti. P. J. Darlington. Mus. Exped. 1934.

19858–63. 6 Paratypes. Mt. La Hotte, 5000–7000 ft., Haiti. P. J. Darlington. Mus. Exped. 1934.

LEPTODEIRA BAKERI Ruthven

1936, Occ. Papers Mus. Zool. Univ. Michigan, No. 330, p. 1.

46511. Paratype. Bubali, Aruba Id., Dutch West Indies. H. B. Baker. Exch. Michigan Mus. 1942.

LEPTODEIRA LARCORUM Schmidt & Walker

1943, Zool. Series Field Mus. Nat. Hist., **24**, p. 311.

17412–6. 5 Paratypes. Perico, Peru. G. K. Noble. Harvard Peruvian Exped. 1916.

17454–65. 11 Paratypes. Bellavista, Peru. G. K. Noble. Harvard Peruvian Exped. 1916.

LEPTODEIRA YUCATANENSIS MALLEISI Dunn & Stuart

1935, Occ. Papers Mus. Zool. Univ. Michigan, No. 313, p. 1.

46512. Paratype. Near La Libertad, Guatemala. H. Malleis. Exch. Michigan Mus. 1942.

LEPTOPELIS AUBRYI (A. Duméril). See L. BARBOURI Ahl

LEPTOPELIS BARBOURI Ahl = ? L. AUBRYI (A. Duméril)

1930, Sitz. Ges. Naturf. Freunde Berlin, p. 199.

13661–71. 11 Cotypes. Mt. Lutindi, Usambara Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

The above represents the present status of this frog, of which all but 2 cotypes are juvenile. In view of the wide gap in the distribution between *aubryi* and *barbouri*, perhaps the latter may be distinct.

LEPTOPELIS BEQUAERTI Loveridge

1941, Proc. U. S. Nat. Mus., **91**, p. 128.

12000. Type. Gbanga, Liberia. J. C. Bequaert. Harvard Med. Sch. Exped. 1927.

12001. Paratype. Gbanga, Liberia. J. C. Bequaert. Harvard Med. Sch. Exped. 1927.

12002–3. 2 Paratypes. Plantation No. 3, Du River, Liberia. G. M. Allen. Harvard Med. Sch. Exped. 1927.

LEPTOPELIS KARISSIMBENSIS Ahl. See L. RUGEGENSIS Ahl

LEPTOPELIS LEBEAUI (Witte). See HYLAMBATES LEBEAUI Witte

LEPTOPELIS MODESTUS (Werner)
See HYLAMBATES RUFUS MODESTA Werner

LEPTOPELIS RUGEGENSIS Ahl. = L. KARISSIMBENSIS Ahl

1929, Sitsb. Ges. Naturf. Freunde Berlin, p. 218.

17531. Cotype. Rugege Forest, Belgian Ruanda. H. Schubotz. Exch. Berlin Mus. 1932.

LEPTOPELIS SIGNIFER Ahl = L. VERMICULATUS (Boulenger)

1930, Sitz. Ges. Naturf. Freunde Berlin, p. 216.

17530. Cotype. Derema, Usambara Mtns., Tanganyika Territory. O. Neumann. Exch. Berlin Mus. 1932.

LEPTOPELIS TANGANUS Ahl = L. ULUGURUENSIS Barbour & Loveridge

1930, Sitz. Ges. Naturf. Freunde Berlin, p. 221.

17529. Cotype. Buloa, Usambara Mtns., Tanganyika Territory G. Eismann. Exch. Berlin Mus. 1932.

LEPTOPELIS ULUGURUENSIS Barbour & Loveridge
See L. TANGANUS Ahl

LEPTOPELIS VERMICULATUS (Boulenger). See L. SIGNIFER Ahl

LEPTOPHIS AHAETULLA BOLIVIANUS Oliver

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 462, p. 1.

27553. Paratype. Dept. Sta. Cruz, Bolivia. José Steinbach. Exch. Michigan Mus. 1929.

LEPTOPHIS COERULEODORSUS Oliver

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 462, p. 4.

6740. Paratype. Port of Spain, Trinidad. T. Barbour. 1903.
11994–5. 12026–7. 4 Paratypes. Milford Bay, Tobago. H. L. Clark & W. B. Broadway. H. L. Clark. 1916.

LEPTOPHIS MEXICANUS YUCATANENSIS Oliver

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 462, p. 10.

15550. Paratype. Chichen Itza, Yucatan. E. H. Thompson. E. H. Thompson. 1911.
22063–4. 2 Paratypes. Chichen Itza, Yucatan. Oliver Ricketson. O. Ricketson. 1925.

LEPTOPHIS NEBULOSUS Oliver

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 462, p. 12.

15287. Type. Casablanca, Costa Rica. Mus. Nac. da Costa Rica. 1921.
17094. Paratype. Matagalpa, Nicaragua. W. B. Richardson. Bt. by M. C. Z. 1909.

LEPTOPHIS OCCIDENTALIS CHOCOENSIS Oliver

1942, Occ. Papers Mus. Zool. Univ. Michigan, No. 462, p. 15.

13298. Paratype. Choco, Colombia. M. V. Campbell. M. V. Campbell. 1919.

LEPTOTYPHLOPS COLOMBI Klauber

1939, Trans. San Diego Soc. Nat. Hist., **9**, p. 62, fig. 3 a-b.

48773. Paratype. Watling's Island, Bahamas. W. W. Worthington. Exch. Carnegie Mus. 1945.

LEPTOTYPHLOPS CONJUNCTA CONJUNCTA (Jan)
See GLAUCONIA MERKERI Werner

LEPTOTYPHLOPS EMINI PEMBAE Loveridge

1941, Proc. Biol. Soc. Washington, **54**, p. 177.

46116. Type. Wingwi Pwana, Pemba Island. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

1911 and 46117–21. 6 Paratypes. Chakechake; Kinazini; Kinowe & Vitongozi, Pemba Island. R. H. W. Pakenham & Loveridge's collector. R. H. W. Pakenham & T. Barbour. 1941 & 1924.

LEPTOTYPHLOPS HUMILIS CAHUITAE Klauber

1931, Trans. San Diego Soc. Nat. Hist., **6**, p. 339.

46647. Paratype. Yaqui Well, San Diego Co., California. L. M. Klauber. Exch. L. M. Klauber. 1942.

LEPTOTYPHLOPS MAXIMUS Loveridge

1932, Proc. Biol. Soc. Washington, **45**, p. 151.

33604. Type. Chilpancingo, Guerrero, Mexico. W. W. Brown. T. Barbour. 1932.

33605-7. 3 Paratypes. Chilpancingo, Guerrero, Mexico. W. W. Brown. T. Barbour. 1932.

LEPTOTYPHLOPS TENELLA Klauber

1939, Trans. San Diego Soc. Nat. Hist., **9**, p. 59, fig. 1 a-b.

48774. Paratype. Mt. St. Benedict, St. George Co., Trinidad. M. G. Netting. Exch. Carnegie Mus. 1945.

LEUROGNATHUS MARMORATA INTERMEDIA Pope

1928, Amer. Mus. Nov., No. 306, p. 14.

13824–5. 2 Paratypes. Davis Gap, Waynesville, North Carolina. C. H. Pope. Exch. American Mus. 1928.

LIASIS AMETHISTINUS KINGHORNI Stull

1933, Occ. Papers Mus. Zool. Univ. Michigan, No. 267, p. 3.

35021. Paratype. Cucania, nr. Babinda, Queensland. W. E. Schevill. Harvard Australian Exped. 1932.

35022. Type. Lake Barrine, 2300 ft., Queensland. W. E. Schevill Harvard Australian Exped. 1932.

35023–4. Paratypes. Lake Barrine, 2300 ft., Queensland. P. J. Darlington. Harvard Australian Exped. 1932.

Liasis childreni perthensis Stull

1932, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 26, pl. ii, fig. A.

24426. Holotype. Perth, West Australia. W. S. Brooks. T. Barbour. 1927.

Limnodynastes dorsalis insularis Parker

1940, Novit. Zool., **42**, p. 47.

19258. Eaglehawk Neck, Tasmania. F. N. Blanchard. Exch. Michigan Mus. 1933.

19330. ——, Tasmania. T. M. S. English. Exch. Queen Victoria Mus. 1933.

The first number was erroneously given as M. C. Z. 19238.

Limnodynastes spenceri Parker

1940, Novit. Zool., **42**, p. 50.

18535–46. 12 Paratypes. Hermannsburg Mission, Finke River, Central Australia. W. E. Schevill. Harvard Australian Exped. 1932.

Limnodytes granulatus Boettger= Mantidactylus granulatus (Boettger)

1881, Zool. Anz., p. 361.

17711. Cotype. Nossi Be, Madagascar. A. Stumpff. Exch. Senckenberg Mus. 1932.

Limnomedusa misionis Schmidt

1944, Zool. Series Field Mus. Nat. Hist., **29**, p. 153.

17429–30. 2 Paratypes. Misiones Territory, Rio Paranay, Argentina. K. P. Schmidt. Exch. Field Mus. 1931.

LIOLAEMUS ALTISSIMUS ALTISSIMUS Müller & Hellmich

1932, Zool. Anz., **98**, p. 197, figs. 1-2.

38611–2. 2 Paratypes. Fierro Carrera, Chile. W. Hellmich. Exch. Munich Mus. 1935.

LIOLAEMUS MONTICOLA MONTICOLA Müller & Hellmich

1932, Zool. Anz., **99**, p. 177, fig. 1.

38629–30. 2 Paratypes. Rio San Francisco, Chile. W. Hellmich Exch. Munich Mus. 1935.

38631–2. 2 Paratypes. Valparaiso, Chile. W. Hellmich. Exch. Munich Mus. 1935.

LIOLAEMUS NIGROMACULATUS COPIAPENSIS Müller & Hellmich

1933, Zool. Anz., **103**, p. 135.

38635–7. 3 Paratypes. Copiapó, Chile. Hellmich & Goetsch. Exch. Munich Mus. 1935.

LIOLAEMUS NIGROMACULATUS KUHLMANNI Müller & Hellmich

1933, Zool Anz., **103**, p. 139, fig. 5.

38633–41. 6 Paratypes. Jalonel, nr. Los Andes, Chile. O. Kuhlmann. Exch. Munich Mus. 1935.

LIOLAEMUS WALKERI Shreve

1938, Journ. Washington Acad. Sci., **28**, p. 404.

43770. Type. Llocllapampa, Dept. Junin, Peru. W. F. Walker, Jr. W. F. Walker, Jr. 1937.

43771–9. 9 Paratypes. Llocllapampa, Dept. Junin, Peru. W. F. Walker, Jr. W. F. Walker, Jr. 1937.

LITHODYTES GAIGEI Dunn = ELEUTHERODACTYLUS GAIGEI (Dunn)

1931, Occ. Papers Boston Soc. Nat. Hist., **5**, p. 387.

9901. 9904. 2 Paratypes. Talamanca Valley, Costa Rica. Dunn & Duryea. T. Barbour. 1923.

10011. Type. Fort Randolph, Canal Zone. Panama Exped. T. Barbour. 1924.

LYCOPHIDION CAPENSE ORNATUM Parker. See L. ORNATUM Parker

LYCOPHIDION CAPENSE UZUNGWENSIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 375.

30117. Type. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30118. Paratype. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

LYCOPHIDION ORNATUM Parker = L. CAPENSE ORNATUM Parker

1936, Novit. Zool., **40**, p. 122.

42686. Paratype. Muko, Lake Bunyonyi, Uganda. C. R. S. Pitman. Exch. British Mus. 1937.

L. c. ornatum Parker is well represented in the collection by a fine series from Idjwi Id., Lake Kivu, Belgian Congo.

LYGODACTYLUS ANGOLENSIS Bocage. See L. LAURAE Schmidt

LYGODACTYLUS ANGULARIS HEENENI Witte. See L. HEENENI Witte

LYGODACTYLUS BRADFIELDI Hewitt = L. CAPENSIS A. Smith

1932, Ann. Natal Mus., **7**, p. 126, pl. vi, fig. 10.

33443. Cotype. Quickborn, nr. Okahandja, South West Africa. R. D. Bradfield. Exch. Albany Mus. 1932.

The reasons for synonymizing *bradfieldi* as well as other taxonomic changes in this genus, here recorded for the first time, will be given in a revision of the Gekkonidae now in course of preparation by the junior author.

LYGODACTYLUS CAPENSIS A. Smith. See L. BRADFIELDI Hewitt

LYGODACTYLUS DEPRESSUS Schmidt =
L. PICTURATUS DEPRESSUS Schmidt

1919, Bull. Am. Mus. Nat. Hist., **39**, p. 466, pl. xvii, fig. 2.

45987. Paratype. Medje, Ituri Forest, Belgian Congo. H. Lang. Exch. American Mus. 1941.

LYGODACTYLUS GROTEI PAKENHAMI Loveridge

1941, Proc. Biol. Soc. Washington, **54**, p. 176.

46082. Type. Wete, Pemba Id., East Africa. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

46083–5. 3 Paratypes. Wete, Pemba Id., East Africa. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

46081. Paratype. Kinazini, Pemba Id., East Africa. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

LYGODACTYLUS HEENENI Witte=L. ANGULARIS HEENENI Witte

1933, Revue Zool. Bot. Afr., **23**, p. 185.

42859. Paratype. Kapiri, Katanga, Belgian Congo. G. F. de Witte. Exch. Congo Mus. 1937.

LYGODACTYLUS LAURAE Schmidt=L. ANGOLENSIS Bocage

1924, Ann. Carnegie Mus., **22**, p. 4.

38691. Paratype. Chitau, Bihe District, Angola. R. Boulton. Exch. Field Mus. 1935.

39727. Paratype. Chitau, Bihe District, Angola. R. Boulton. Exch. Carnegie Mus. 1936.

LYGODACTYLUS PICTURATUS DEPRESSUS Schmidt

See L. DEPRESSUS Schmidt

LYGODACTYLUS PICTURATUS KENIENSIS Parker

1936, Ann. Mag. Nat. Hist. (10), **18**, p. 602.

42697. Paratype. Kerio River, Turkana, Kenya Colony. W. P. Lowe. Exch. British Mus. 1937.

42698. Paratype. Lodwar, Turkana, Kenya Colony. V. E. Fuchs. Exch. British Mus. 1937.

LYGODACTYLUS PICTURATUS MOMBASICUS Loveridge

1935, Proc. Biol. Soc. Washington, **48**, p. 198.

38537–42. 6 Paratypes. Frere Town, Kenya Colony. A .Loveridge. T. Barbour. 1924.

30586, 8, 9, 91–93. 6 Paratypes. Kilindini, Mombasa Id., Kenya Colony. A. Loveridge. Mus. Exped. 1930.

30590. Type. Kilindini, Mombasa Id., Kenya Colony. A. Loveridge. Mus. Exped. 1930.

Lygodactylus picturatus sudanensis Loveridge

1935, Proc. Biol. Soc. Washington, **48**, p. 197.

8796. Paratype. El Mesherat, Senaar, Anglo-Egyptian Sudan. G. M. Allen. J. C. Philips. 1913.

8799. 8801. 2 Paratypes. Abu Zor, Senaar, Anglo-Egyptian Sudan. G. M. Allen. J. C. Phillips. 1913.

8800. Type. Abu Zor, Senaar, Anglo-Egyptian Sudan. G. M. Allen. J. C. Phillips. 1913.

8802. Paratype. Roseires, Senaar, Anglo-Egyptian Sudan. G. M. Allen. J. C. Phillips. 1913.

Lygodactylus picturatus ukerewensis Loveridge

1935, Proc. Biol. Soc. Washington, **48**, p. 199.

17978–9. 2 Paratypes. Loita Plains, Kenya Colony. C. P. Curtis. C. P. Curtis. 1923.

30536–41. 30542–60. 34 Paratypes. Ukerewe Id., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30542. Type. Ukerewe Id., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

Lygodactylus somalicus somalicus Loveridge

1935, Proc. Biol. Soc. Washington, **48**, p. 196.

35558. Type. Bar Madobe, Nogal Valley, British Somaliland. R. H. R. Taylor. Exch. British Mus. 1933.

35559. Paratype. Bar Madobe, Nogal Valley, British Somaliland. R. H. R. Taylor. Exch. British Mus. 1933.

Lyogosoma (sic) akeleyi Meek= Chalcides ocellatus ocellatus Forskäl

1897, Field Mus. Nat. Hist., Zool. Series, **1**, p. 181, fig.

34990. Paratype. Berbera, British Somaliland. C. Akeley. Exch. Field Mus. 1933.

LYGOSOMA EMIGRANS Van L. de Jeude=
LYGOSOMA (SPHENOMORPHUS) EMIGRANS (Van L. de Jeude)

1895, Notes Leyden Mus., **16**, p. 125.

38993. Cotype. Soemba, Hetar Id., Dutch East Indies. D. H. ten Kate. Exch. Leyden Mus. 1935.

LYGOSOMA FUSCUM BARBARENSE Kopstein

1926, Zool. Meded. (Leiden), **9**, p. 88.

38982–91. 10 Cotypes. Samlakki, Tenimber Id., Banda Sea. F. Kopstein. Exch. Leyden Mus. 1935.

LYGOSOMA FUSCUM DIGULIENSE Kopstein

1926, Zool. Meded. (Leiden), **9**, p. 88.

38997–81. 5 Cotypes. Assike, Upper Digul River, New Guinea. F. Kopstein. Exch. Leyden Mus. 1935.

LYGOSOMA (HINULIA) FASCIOLATUM INTERMEDIUM Sternfeld=
L. (SPHENOMORPHUS) F. INTERMEDIUM Sternfeld

1919, Senckenbergiana, **1**, p. 81.

33530. Cotype. Hermannsburg, Finke River, Central Australia. M. Leonhardi. Exch. Senckenburg Mus. 1932.

LYGOSOMA (HINULIA) KÜHNEI Roux=
L. (SPHENOMORPHUS) KÜHNEI Roux

1910, Abhand Senckenberg Ges., **33**, p. 237.

27945. Paratype. Kei Island, Molucca Is. Kuhne. Exch. Basel Museum. 1929.

LYGOSOMA (HINULIA) LEONHARDII Sternfeld=
L. (SPHENOMORPHUS) LEONHARDII Sternfeld

1919, Senckenbergiana, **1**, p. 79.

33529. Cotype. Hermannsburg, Finke River, Central Australia. M. Leonhardi. Exch. Senckenberg Mus. 1932.

The Museum of Comparative Zoölogy also possesses a series of topotypes of this and other Hermannsburg species collected by W. E. Schevill.

LYGOSOMA GRAUERI GRAUERI Sternfeld
See L. G. QUINQUEDIGITATA Sternfeld

LYGOSOMA GRAUERI QUINQUEDIGITATA Sternfeld=
L. G. GRAUERI Sternfeld

1912, Wiss. Ergebn. Deutsch Zentral-Afrika Exped., **4**, p. 240, pl. vi, fig. 5.

37205. Cotype. Bugoie Forest, Belgian Ruanda. Stegman & Stein. Exch. Berlin Mus. 1933.

LYGOSOMA JOBIENSE ELEGANS Sternfeld=
L. (SPHENOMORPHUS) J. ELEGANS Sternfeld

1921, Anh. Senckenberg. Nat. Ges., **36**, p. 397, pl. xxxi, fig. 1.

33532–3. 2 Cotypes. Ross Id., New Guinea. E. Wolf. Exch. Senckenberg Mus. 1932.

LYGOSOMA KORATENSE M. A. Smith=RIOPA KORATENSIS (M. A. Smith)

1917, Journ. Nat. Hist. Soc. Siam, **2**, p. 222, pl. –, figs. 1-1b.

39323. Paratype. Lat Bna Kao, Dong Paya Fai Mtns., Siam. M. A. Smith. T. Barbour. 1935.
Dong Paya Fai is apparently the same as Dong Rek Mountains.

LYGOSOMA KUEKENTHALI Boettger=EMOIA KUEKENTHALI (Boettger)

1895, Zool. Anz., **18**, p. 117.

33544. Cotype. Soa Konorra, Halmahera Id., Molucca Is. W. Kükenthal. Exch. Senckenberg Mus. 1932.

LYGOSOMA (LEIOLOPISMA) ELEGANTOIDES LOBULUS Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 50.

47067. Type. Mount Wilhelm, 7500–8000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.
47068–82. 15 Paratypes. Mount Wilhelm, 7500–8000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

LYGOSOMA (LEIOLOPISMA) HAWAIIENSE (Loveridge)
See LEIOLOPISMA HAWAIIENSIS Loveridge

LYGOSOMA (LEIOLOPISMA) PREHENSICAUDA Loveridge

1945 Proc. Biol. Soc. Washington, **58**, p. 48.

47057. Type. Mount Wilhelm, 7500–8000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.
47058. Paratype. Mount Wilhelm, 7500–8000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

LYGOSOMA ORIENTALE Shreve

1940, Proc. New England Zoöl. Club, **18**, p. 19.

44742. Type. Mt. Victoria, Pakokku-Chin Hills, Burma. G. Heinrich. T. Barbour. 1938.
44743. Paratype. Mt. Victoria, Pakokku-Chin Hills, Burma. G. Heinrich. T. Barbour. 1938.

LYGOSOMA (SPHENOMORPHUS) BIGNELLI Schmidt
See S. BIGNELLI Schmidt

LYGOSOMA (SPHENOMORPHUS) EMIGRANS (Van L. de Jeude)
See L. EMIGRANS Van L. de Jeude

LYGOSOMA (SPHENOMORPHUS) FASCIOLATUM INTERMEDIUM Sternfeld
See L. (HINULIA) F. INTERMEDIUM Sternfeld

LYGOSOMA (SPHENOMORPHUS) JOBIENSE ELEGANS Sternfeld
See L. J. ELEGANS Sternfeld

LYGOSOMA (SPHENOMORPHUS) LEAE BROOKSI Loveridge
See SPHENOMORPHUS L. BROOKSI Loveridge

LYGOSOMA (SPHENOMORPHUS) LEONHARDII Sternfeld
See L. (HINULIA) LEONARDII Sternfeld

LYGOSOMA (SPHENOMORPHUS) KÜHNEI Roux
See L. (HINULIA) KÜHNEI Roux

LYGOSOMA VICTORIANUM Shreve

1940, Proc. New England Zoöl. Club, **18**, p. 17.

44738. Type. Mt. Victoria, Pakokku-Chin Hills, Burma. G. Heinrich. T. Barbour. 1938.

44729. Paratype. Mt. Victoria, Pakokku-Chin Hills, Burma. G. Heinrich. T. Barbour. 1938.

MABUYA FRENATA COCHABAMBAE Dunn

1935, Proc. Acad. Nat. Sci. Philadelphia, **87**, p. 553.

46532. Paratype. Pocona, Dept. Cochabamba, Bolivia. F. B. Steinbach. Exch. Michigan Mus. 1942.

MABUYA ISSELII (Peters). See EUPREPES (EUPREPIS) ISSELII Peters

MALACOCHERSUS TORNIERI (Siebenrock)
See TESTUDO LOVERIDGII Boulenger

MANTIDACTYLUS BETSILEANUS (Boulenger)
See RANA BETSILEANA Boulenger

MANTIDACTYLUS DECARYI (Angel)
See GEPHYROMANTIS DECARYI Angel

MANTIDACTYLUS TRIPUNCTATUS Angel

1931, Bull. Mus. Hist. Nat. Paris (2), **2**, p. 619.

17460. Cotype. Pic St. Louis, Fort Dauphin Prov., Madagascar. A. Decary. Exch. Paris Mus. 1932.

MASTICOPHIS FLAGELLUM LINEATULUS H. M. Smith

1941, Journ. Washington Acad. Sci., **31**, p. 394.

14280. Paratype. 3 miles W. of Las Cruces, New Mexico. W. Huber. J. E. Thayer. 1920.

MASTICOPHIS RUTHVENI Ortenburger

1923, Occ. Papers Mus. Zool. Univ. Michigan, No. 139, p. 3.

46506. Paratype. Brownsville, Texas. Exch. Michigan Mus. 1942.

MEGALIXALUS FORNASINII (Bianconi)
See M. F. VAR. UNICOLOR Boettger

MEGALIXALUS FORNASINII VAR. UNICOLOR Boettger=
M. FORNASINII (Bianconi)

1913, in Voeltzkow, Reise in Ostafrika, **3**, p. 349.

15429. Cotype. Pemba Id., nr. Zanzibar. A. Voeltzkow. Exch. Senckenberg Mus. 1929.

MELANOSEPS ATER MATENGOENSIS Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 361.

44119. Cotype. Ugano, Matengo Highlands, Tanganyika Territory. H. Zerny. Exch. Vienna Mus. 1938.

MELANOSEPS ATER RONDOENSIS Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 360.

47780. Type. Nchingidi, Rondo Plateau, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

47781–800. 20 Paratypes. Nchingidi, Rondo Plateau, Tanganyika. Territory. A. Loveridge. Mus. Exped. 1930.

MELANOSEPS ATER UZUNGWENSIS Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 361.

31076. Type. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

31077. Paratype. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

MENOBRANCHUS PUNCTATUS Gibbes=NECTURUS PUNCTATUS (Gibbes)

1850, Proc. Amer. Assoc. Adv. Sci. Charleston, p. 159.

1553. Cotype. Santee River, South Carolina. L. R. Gibbes. L. R. Gibbes.

Micrurus affinis mayensis Schmidt

1933, Field Mus. Nat. Hist. Zool. Series, **20**, p. 37.

7247. Paratype. Chichen Itza, Yucatan. L. J. Cole. A. Agassiz.

28749. Paratype. Chichen Itza, Yucatan. J. C. Bequaert. J. C. Bequaert. 1929.

31871. Paratype. Chichen Itza, Yucatan. Geo. Shattuck. Geo. Shattuck. 1930.

31872. Type. Chichen Itza, Yucatan. Geo. Shattuck. Geo. Shattuck. 1930.

31874. Paratype. Valladolid, Yucatan. Geo. Shattuck. Geo. Shattuck. 1930.

Micrurus ancoralis jani Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 197.

11151. Paratype. Andagoya, Choco, Colombia. Bt. of Rosenberg. T. Barbour. 1915.

13270. Paratype. Andagoya, Choco, Colombia. M. V. Campbell. M. V. Campbell. 1919.

32720,-1,-3. 3 Paratypes. Andagoya, Choco, Colombia. W. H. White. W. H. White. 1929.

32722. Type. Andagoya, Choco, Colombia. W. H. White. W. H. White. 1929.

The describer errs in attributing the Type to Dr. H. G. F. Spurrell, the collector and donor being Dr. W. H. White, 1929.

Micrurus browni Schmidt and Smith

1943, Field Mus. Nat. Hist. Zool. Series, **29**, p. 30.

33666-8. 3 Paratypes. Chilpancingo, Guerrero, Mexico. W. W. Brown. T. Barbour. 1932.

Micrurus clarki Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 211

38390. Holotype. Yavisa, Darien, Panama Republic. H. C. Clark. T. Barbour. 1934.

Micrurus ecuadorianus Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 196.

3559. Type. Daule River, Ecuador. S. Garman. A. Agassiz. 1875.
3569. Paratype. Daule River, Ecuador. S. Garman. A. Agassiz. 1875.
8399. Paratype. Guayaquil, Ecuador. E. Whymper. E. Whymper. 1899.

Micrurus fulvius barbouri (Schmidt)

See Elaps f. barbouri Schmidt

Micrurus latifasciatus Schmidt

1933, Field Mus. Nat. Hist. Zool. Series, **20**, p. 35.

22133. Paratype. Finca Cipres, Guatemala. H. E. Anthony. T. Barbour. 1926.
22135. Type. Finca Carolina, Guatemala. H. E. Anthony. T. Barbour. 1926.

Micrurus nigrocinctus coibensis Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 208.

37061–3. 3 Paratypes. Coiba Id., Panama Republic. R. Carpenter. R. Carpenter. 1933.

Micrurus nigrocinctus mosquitensis Schmidt

1933, Field Mus. Nat. Hist. Zool. Series, **20**, p. 33.

9548. Paratype. Ocatal, Nicaragua. W. B. Richardson. Bt. by M. C. Z. 1909.
9570. 17087. 2 Paratypes. Matagalpa, Nicaragua. W. B. Richardson. Bt. by M. C. Z. 1909.
19333. Paratype. Coen Dispensary, Costa Rica. Dunn & Duryea. T. Barbour. 1923.
19741. Type. Limon, Costa Rica. S. Kriss. United Fruit Co. 1924.
19742. Paratype. Limon, Costa Rica. S. Kriss. United Fruit Co. 1924.
20449. Paratype. Nr. Almirante, Panama Republic. United Fruit Co. United Fruit Co. 1925.

22211–2. 2 Paratypes. Nr. Almirante, Panama Republic. F. H. Kennard. F. H. Kennard. 1926.

Micrurus nuchalis Schmidt

1933, Field Mus. Nat. Hist. Zool. Series, **20**, p. 35.

27830. Holotype. Tapanatepec, Oaxaca, Mexico. W. W. Brown. T. Barbour. 1927.

Micrurus peruvianus Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 193.

17385. Type. Perico, Peru. G. K. Noble. Harvard Peruvian Exped. 1916.

17386–9. 4 Paratypes. Perico, Peru. G. K. Noble. Harvard Peruvian Exped. 1916.

According to the author, M. C. Z. 17384 from Bellavista, Peru, is doubtfully referable to this form which is nearly related to *corallinus* (Wied).

Micrurus transandinus Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 195.

32744. Type. Andagoya, Choco, Colombia. W. H. White. W. H. White. 1929.

32742–3. 32745–6. 4 Paratypes. Andagoya, Choco, Colombia. W. H. White. W. H. White. 1929.

The describer errs in attributing this series to Dr. H. G. F. Spurrell, 1915, the collector and donor was Dr. W. H. White, 1929.

Mixophyes fasciolatus schevilli Loveridge

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 55.

18150. Type. Millaa Millaa, Atherton Tableland, Queensland. P. J. Darlington. Harvard Australian Exped. 1932.

18480. Paratype. Lake Barrine, Atherton Tableland, Queensland. W. E. Schevill. Harvard Australian Exped. 1932.

18481. Paratype. Tick Camp, Bellenden Ker Range, Queensland. W. E. Schevill. Harvard Australian Exped. 1932.

Morunasaurus groi Dunn

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 76.

34875. Type. El Valle de Antón, Panama Republic. E. R. Dunn. E. R. Dunn. 1933.

34876–7. 2 Paratypes. El Valle de Antón, Panama Republic. E. R. Dunn. E. R. Dunn. 1933.

Nannobatrachus anamallaiensis Myers

1942, Proc. Biol. Soc. Washington, **55**, p. 49.

25599. Paratype. Puthutotam Estate, Valparai P. O., Anamallai Hills, 3600–3800 feet, Southern India. A. W. Herre. Exch. Stanford Univ. Mus. 1943.

Natrix cyclopion floridana Goff

1936, Occ. Papers Mus. Zool. Univ. Michigan, No. 327, p. 1.

44. Paratype. Florida. L. G. Pourtales. Count Pourtales. N. D.

14805–10. 4 Paratypes. Palm Beach, Florida. T. Barbour. T. Barbour. 1920.

22670. 38577. 2 Paratypes. Sebastian, Florida. G. Nelson. G. Nelson. 1920.

Natrix godmani (Boulenger)

See Tropidonotus godmani Boulenger

Natrix olivacea pembana Loveridge = Neusterophis o. pembanus (Loveridge)

1935, Bull. Mus. Comp. Zoöl., **79**, p. 8.

19112. Holotype. Chakechake, Pemba Id. Loveridge's collector. A. Loveridge & T. Barbour. 1924.

At the time of its description the only known example with 15 midbody scale-rows; subsequently a second turned up in the Matengo Highlands of Tanganyika Territory with a series of the mainland montane form possessing 17 rows. Still more recently several snakes from Pemba have been received with 17 rows, others with 15, so that the race is doubtful.

Natrix olivacea uluguruensis Loveridge = Neusterophis o. uluguruensis (Loveridge)

1935, Bull. Mus. Comp. Zoöl., **79**, p. 7.

18445–6. 23094. 3 Paratypes. Bagilo, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1924 & 1927.

23095. 1 Paratype. Mkangazi, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

23096–116. 21 Paratypes. Nyange, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

23117. Type. Nyange, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

23119, 23130–1. 3 Paratypes. Nyingwa, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

23132. 1 Paratype. Vituri, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

23136–59. 24 Paratypes. Amani, Usambara Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

23163. 1 Paratype. Bumbuli, Usambara Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

Natrix sipedon engelsi Barbour

1943, Proc. New England Zoöl. ,Club **22**, p. 1, pl. i.

46688. Holotype. Mullet Pond, Shackleford Banks, Carteret Co., N. Carolina. Dr. W. L. Engels. Prof. R. E. Coker. 1943.

Necturus maculosus lewisi Brimley

1924, Journ. Elisha Mitchell Sci. Soc., **40**, p. 167.

17726–7. 2 Cotypes. Raleigh, Neuse River, N. Carolina. F. Lewis. T. Barbour. 1932.

17729. Cotype. Crabtree Creek, N. Carolina. F. Lewis. T. Barbour 1932.

Necturus maculosus stictus Bishop

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 451, p. 9.

25578–9. 2 Paratypes. Lake Winnebago, Winnebago Co., Wisconsin. J. Pawlack. Exch. S. C. Bishop. 1942.

NECTURUS PUNCTATUS (Gibbes)
See MENOBRANCHUS PUNCTATUS Gibbes

NEPHRURUS WHEELERI Loveridge

1932, Proc. New England Zoöl. Club, **13**, p. 31.

32950. Type. Yandil, Western Australia. A. G. Paterson. Harvard Australian Exped. 1931.

32951–3. 3 Paratypes. Yandil, Western Australia. A. G. Paterson. Harvard Australian Exped. 1931.

The numbers are erroneously given in the description as 32590-3.

NEUSTEROPHIS OLIVACEUS PEMBANUS (Loveridge)
See NATRIX O. PEMBANA Loveridge

NEUSTEROPHIS OLIVACEUS ULUGURUENSIS (Loveridge)
See NATRIX O. ULUGURUENSIS Loveridge

NEUSTICURUS ECPLEOPUS OCELLATUS Sinitsin
See N. OCELLATUS Sinitsin

NEUSTICURUS OCELLATUS Sinitsin=
N. ECPLEOPUS OCELLATUS Sinitsin

1930, Amer. Mus. Novit., No. 408, p. 1.

34870. Paratype. Perené, Peru. Carlos Schunke. Exch. American Mus. 1933.

NEUSTICURUS TUBERCULATUS Shreve

1935, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 209.

37264–6. 3 Paratypes. Pastaza River between Canelos and Marañon River, Ecuador. C. Spencer. T. Barbour. 1935.

37711. Type. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1932.

NINIA SEBAE MORLEYI Schmidt & Andrews

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 169.

26801–25. 25 Paratypes. Chichen Itza, Yucatan. E. H. Thompson. E. H. Thompson. N. D.

NYCTIBATRACHUS MAJOR Boulenger

1882, Cat. Batr. Sal. Ecaud. Brit. Mus. (London), p. 114, pl. xii, fig. 2.

15405. Cotype. Malabar. Beddome. Exch. British Mus. 1929.

NYCTIMYSTES MILNEANA Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 58.

11652. Type. Milne Bay, East Division, Papua. Exch. British Mus. 1925.

NYCTIMYSTES MONTANA Parker

1936, Ann. Mag. Nat. Hist. (10), **17**, p. 80, fig. 4.

21327–9. 3 Paratypes. Kokoda, 1200 ft., New Guinea. L. E. Cheeseman. Exch. British Mus. 1935.

OEDIPUS BARBOURI Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 43.

21247. Type. Portello Grande, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

21248–50. 3 Paratypes. Portello Grande, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

OEDIPUS BROMELIACEA Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 161, fig. 18 (part).

22177–9. 3 Paratypes. Volcan Tajumulco, 8000 ft., Guatemala. K. P. Schmidt. Exch. Field Mus. 1937.

OEDIPUS ENGELHARDTI Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 156, fig. 18 (part).

22182–4. 3 Paratypes. Volcan Atitlan, 7000 ft., Guatemala. F. J. W. Schmidt. Exch. Field Mus. 1937.

OEDIPUS FLAVIMEMBRIS Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 158.

22174. Paratype. Volcan Tajumulco, 7000 ft., Guatemala. F. J. W. Schmidt. Exch. Field Mus. 1937.

OEDIPUS FRANKLINI Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 159, fig. 19.

22180–1. Paratype. Volcan Atitlan, 7000 ft., Guatemala. K. P. Schmidt. Exch. Field Mus. 1937.

OEDIPUS GOEBELI Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 163.

22715–6. 2 Paratypes. Volcan Tajumulco, 8000 ft., Guatemala. K. P. Schmidt. Exch. Field Mus. 1937.

OEDIPUS HELMRICHI Schmidt

1936, Field Mus. Nat. Hist. Zool. Series, **20**, p. 152, fig. 18 (part).

22185. Paratype. Above Finca Samar, 5000 ft., Alta Verapaz, Guatemala. D. Clark. Exch. Field Mus. 1937.

OEDIPUS MOSAUERI Woodall

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 444, p. 1.

24576. Paratype. Durango, Hidalgo, Mexico. Woodall & Swingeton. Exch. Michigan Mus. 1941.

OEDIPUS MULTIDENTATA Taylor=
BOLITOGLOSSA MULTIDENTATA (Taylor)

1939 (1938), Univ. Kansas Sci. Bull., **25**, p. 289.

14812. Type. Alvarez, San Luis Potosi, Mexico. W. W. Brown. T Barbour. 1927.

14810–1. 2 Paratypes. Alvarez, San Luis Potosi, Mexico. W. W. Brown. T. Barbour. 1927.

OEDIPUS ODONELLI Stuart

1943, Misc. Publ. Mus. Zool. Univ. Michigan, No. 56, p. 10.

25540. Paratype. Finca Volcán, Alta Verapaz, Guatemala. L. C. Stuart. Exch. Michigan Museum. 1942.

OEDIPUS ORIZABENSIS (Blatchley)
See SPELERPES ORIZABENSIS Blatchley

OEDIPUS ROBERTSI Taylor

1939 (1938), Univ. Kansas Sci. Bull., **25**, p. 287, pl. xxvi, fig. 2.

25610. Paratype. Nevada de Toluca, 10,000–11,000 ft., Mexico, Mexico. E. H. Taylor, et al. Exch. E. H. Taylor. 1942.

OEDIPUS SMITHI Taylor = BOLITOGLOSSA SMITHI (Taylor)

1939 (1938), Univ. Kansas Sci. Bull., **25**, p. 269, pl. xxv, figs. 5-6.

25611–2. 2 Paratypes. Cerro San Felipe 15 miles northwest, Oaxaca, Mexico. E. H. Taylor. Exch. E. H. Taylor. 1942.

OEDURA KARROICA WILMOTI Hewitt =
AFROEDURA KARROICA KARROICA (Hewitt)

1926, Ann. Natal Mus., **5**, p. 446, pl. xxv, figs. 1-2.

22090–3. 4 Cotypes. Tarkastad, Cape Province. C. W. Wilmot. Exch. Albany Mus. 1926.

OEDURA NAMAQUENSIS FitzSimons
AFROEDURA NAMAQUENSIS (FitzSimons)

1938, Ann. Transvaal Mus., **19**, p. 163, figs. 1-2.

46803. Paratype. Between Springbok & Kamaggas, Little Namaqualand, Cape Province. V. FitzSimons. Exch. Transvaal Mus. 1943.

OEDURA TEMBULICA Hewitt =
AFROEDURA TEMBULICA (Hewitt)

1926, Ann. S. African Mus., **20**, p. 415.

22094. Cotype. Cofimvaba, Tembuland, Cape Province. C. W. Wilmot. Exch. Albany Mus. 1926.

OEDURA TRANSVAALICA TRANSVAALICA Hewitt =
AFROEDURA T. TRANSVAALICA (Hewitt)

1925, Rec. Albany Mus., **3**, p. 350, pl. xvi, fig. 1, pl. xvii, fig. 1.

41819. Paratype. Njelele River, Zoutpansberg District, Transvaal. G. van Dam. Exch. Transvaal Mus. 1936.

OLIGOSOMA GEMMINGERI Cope = LEIOLOPISMA UNICOLOR (Harlan)

1864, Proc. Acad. Nat. Sci. Philadelphia, p. 180.

46960. Cotype. Orizaba, Mexico. F. Sumichrast. Exch. U. S. Nat. Mus. 1944.

Original number of this specimen was Smithsonian Institute 6331.

ONYCHOCEPHALUS DINGA Peters =
TYPHLOPS SCHLEGELII SCHLEGELII Bianconi

1854, Monatsb. Akad. Wiss. Berlin, p. 620.

32344. Cotype. Tete, Mozambique. W. Peters. Exch. Berlin Mus. 1932.

ONYCHODACTYLUS JAPONICUS (Houltyn)
See SALAMANDRA UNGUICULATA Schlegel

OOEIDOZYGA FLORESIANA Mertens

1927, Senckenbergiana, **9**, p. 234.

15810. Paratype. Rana Mese, Flores, Dutch East Indies. R. Mertens. Exch. Senckenberg Mus. 1930.

OPHEODRYS VERNALIS BLANCHARDI Grobman

1941, Misc. Publ. Mus. Zool. Univ. Michigan, No. 50, p. 11.

5277. Paratype. Santa Fe, New Mexico. Prof. Agassiz. 1885.

OPHIOPS ELEGANS var. PERSICUS Boulenger =
OPHISOPS E. PERSICUS (Boulenger)

1918, Ann. Mag. Nat. Hist. (9), **2**, pp. 159, 160.

28693. 1. Shiraz, Persia. Exch. British Mus. 1929.

OPHISOPS BLANFORDI Schmidt

1939, Field Mus. Nat. Hist. Zool. Series, **24**, p. 64.

45599–600. 2 Paratypes. Nasiriyah, Iraq. H. Field. Exch. Field Mus. 1940.

OPHISOPS ELEGANS PERSICUS (Boulenger)
See OPHIOPS E. var. PERSICUS Boulenger

OPISTHOTROPIS BALTEATUS (Cope). See O. MULTICINCTATA Fan

OPISTHOTROPIS MULTICINCTATA Fan = O. BALTEATUS (Cope)

1931, Bull. Dept. Biol. Coll. Sci. Sun Yatsen Univ. (Canton), No. 11, p. 82, figs. 5-6.

32414. Paratype. Loshiang, Kwangsi, China. Kwechow Exped. Exch. Sun Yatsen Univ. 1932.

OREOPHRYNE ROOKMAAKERI Mertens

1927, Senckenbergiana, **9**, p. 236.

15816. Paratype. Rana Mese, Flores, Dutch East Indies. R. Mertens. Exch. Senckenberg Mus. 1930.

OXYRHOPUS FITZINGERI FRIZZELLI Schmidt & Walker

1943, Field Mus. Nat. Hist. Zool. Series, **24**, p. 313.

17383. Paratype. Chongollapi, Piura, Peru. G. K. Noble. Harvard Peruvian Exped. 1916.

PACHYDACTYLUS BIBRONI PULITZERAE Schmidt

1934, Ann. Carnegie Mus., **22**, p. 6, pl. i.

39728. Paratype. Pico Azevedo, Mossamedes, Angola. R. Boulton. Exch. Carnegie Mus. 1936.

PACHYDACTYLUS CAPENSIS GARIESENSIS Hewitt =
PACHYDACTYLUS WEBERI GARIESENSIS Hewitt

1932, Ann. Natal Mus., **7**, p. 124, pl. vi, figs. 8-9.

31573–4. 2 Paratypes. Garies to Kamiesberg, Little Namaqualand, South Africa. B. Peers. Exch. Albany Mus. 1931.

PACHYDACTYLUS CAPENSIS LABIALIS FitzSimons

1938, Ann. Transvaal Mus., **19**, p. 168, fig. 7.

46971. Paratype. Steinkopf, Little Namaqualand, Cape Province, S. Africa. V. FitzSimons. Exch. Transvaal Mus. 1944.

PACHYDACTYLUS CAPENSIS TIGRINUS van Dam

1921, Ann. Transvaal Mus., **7**, p. 244, pl. v.

41843. Cotype. Blinkwater, Brak River, Transvaal. G. van Dam. Exch. Transvaal Mus. 1936.

21227-8. 41844-5. 4 Paratypes. N'jelele River, Zoutpansberg, Transvaal. G. van Dam. Exch. Transvaal Mus. 1935. 1936.

PACHYDACTYLUS KOBOSENSIS FitzSimons

1938, Ann. Transvaal Mus., **19**, p. 170.

46804. Paratype. "Kobos" Farm, 40 miles south of Rehoboth, South West Africa. V. FitzSimons. Exch. Transvaal Mus. 1943.

PACHYDACTYLUS LINEATUS RUPICOLUS FitzSimons

1938, Ann. Transvaal Mus., **19**, p. 162.

46818. Paratype. Between O'okiep and Springbok, Little Namaqualand. V. FitzSimons. Exch. Transvaal Mus. 1943.

PACHYDACTYLUS PUNCTÁTUS LANGI FitzSimons

1932, Ann. Transvaal Mus., **15**, p. 35.

33467-90. 4 Paratypes. Gemsbok Pan, Ghanzi Dist., Bechuanaland. Vernay & Lang. Exch. Field Mus. 1932.

PACHYDACTYLUS SCUTATUS ANGOLENSIS Loveridge

1944, Amer. Mus. Novit., No. 1254, p. 3.

46856 Paratype. Hanha, Benguela Dist, Angola. R. Boulton. Exch. Am. Mus. Nat. Hist. 1943.

PACHYDACTYLUS WEBERI ACUMINATUS FitzSimons

1941, Ann. Transvaal Mus., **20**, p. 274.

46817. Paratype. 8 miles west of Aus, Great Namaqualand, South West Africa. V. FitzSimons. Exch. Transvaal Mus. 1943.

Part of the series previously referred with a query to *w. weberi* (1938. Ann. Transvaal Mus., **19**, p. 181).

PALUDICOLA PUSILLA Ruthven=
PSEUDOPALUDICOLA PUSILLA (Ruthven)

1916, Occ. Papers Mus. Zool. Univ. Michigan, No. 30, p. 1.

4757. Paratype. Gaira, Colombia. A. G. Ruthven. Exch. Michigan Mus. 1917.

PELOMEDUSA SUBRUFA OLIVACEA (Schweigger)
See PENTONYX GEHAFIE Rüppell

PELOPHRYNE ALBOTAENIATA Barbour

1938, Proc. Biol. Soc. Washington. **51**, pp. 192, 194, fig.

23291. Holotype. Thumb Peak, Palawan Id., Philippine Is. E. H. Taylor. T. Barbour. 1933.

PENTONYX GEHAFIE Rüppell=
PELOMEDUSA SUBRUFA OLIVACEA (Schweigger)

1835, Neue Wirbelth, Fauna Abyss., Amph., p. 2, pl. i.

42993. Cotype. Massaua, Eritrea. E. Rüppell. Exch. Senckenberg Mus. 1937.

Reasons for synonymizing *gehafie* will be found in a recent revision of the family Pelomedusidae (1941, Bull. Mus. Comp. Zoöl., **88**, p. 480).

PHELSUMA BARBOURI Loveridge

1942, Bull. Mus. Comp. Zool., **89**, p. 458.

11640. Type. Forest between Tamatave and Tananarive, E. Madagascar. F. R. Wulsin. F. R. Wulsin. 1915.

11641. Paratype. Forest between Tamatave and Tananarive, E. Madagascar. F. R. Wulsin. F. R. Wulsin. 1915.

PHELSUMA LINEATA Gray
See PHELSUMIA LINEATA var. BIFASCIATA Boettger

PHELSUMA MADAGASCARIENSIS PARKERI Loveridge

1941, Proc. Biol. Soc. Washington, **54**, p. 175.

46086. Type. Kinowe, Pemba Id. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

46087–92. 6 Paratypes. Kinazini, Pemba Id. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

PHELSUMIA LINEATA var. BIFASCIATA Boettger=
PHELSUMA LINEATA Gray

1913, in Voeltzkow, Reise in Ostafrika, **3**, p. 294.

21950. Cotype. Ankarimbela, E. Madagascar. A. Voeltzkow. Exch. Berlin Mus. 1925.

PHELSUMIA MICROPHOLIS Boettger=
PHELSUMA MUTABILIS (Grandidier)

1913, in Voeltzkow, Reise in Ostafrika, **3**, p. 293, pl. xxiv, figs. 6-7.

21955–7. 3 Cotypes. Tulear, S. W. Madagascar. A. Voeltzkow. Exch. Senckenberg Mus. 1925.

Reasons for synonymizing *microphol*is will be found in a recent revision of the genus *Phelsuma* (1942, Bull. Mus. Comp. Zoöl., **89**, p. 475).

PHILAUTUS EXIMIUS Shreve

1940, Proc. Biol. Soc. Washington, **53**, p. 106.

20879. Type. Queenwood Estate, Dimbulla, Ceylon. W. L. Schofield. T. Barbour. 1933.

20880–4. 5 Paratypes. Queenwood Estate, Dimbulla, Ceylon. W. L. Schofield. T. Barbour. 1933.

PHILAUTUS GRYLLUS M. A. Smith=
RHACOPHORUS VERRUCOSUS Boulenger

1924, Proc. Zool. Soc. London, p. 231, pl. iii, figs. 2-5.

10503–4. 2 Cotypes. Langham Plateau, S. Annam, Indo China. M. A. Smith. Exch. British Mus. 1925.

PHILAUTUS HANSENAE Cochran

1927, Proc. Biol. Soc. Washington, **40**, p. 181.

25738. Paratype. Nong Khor, S. E. Siam. H. M. Smith. Exch. U. S. Nat. Mus. 1944.

PHILAUTUS NONGKHORENSIS Cochran

1927, Proc. Biol. Soc. Washington, **40**, p. 179.

26739. Paratype. Nong Khor, S. E. Siam. H. M. Smith. Exch. U. S. Nat. Mus. 1944.

PHILOCHORTUS HARDEGGERI TAYLORI Parker = P. PHILLIPSI (Boulenger)

1932, Proc. Zool. Soc. London, p. 354.

35562. Paratype. Haud, 2000 ft., British Somaliland. R. H. R. Taylor. Exch. British Mus. 1933.

PHILOCHORTUS INTERMEDIUS Boulenger

1917, Proc. Zool. Soc. London, p. 152, pl. ii, figs. 2-3.

28695. Cotype. Inland of Berbera, British Somaliland. Exch. British Mus. 1929.

PHILOCHORTUS PHILLIPSI (Boulenger)
See P. HARDEGGERI TAYLORI Parker

PHRYNIXALUS REGINAE Anderson = COPHIXALUS ORNATUS (Fry)

1916, Svenska Vetensk.-Akad. Handl. (Stockholm), **52**, No. 9, p. 4, figs. 1a-d

17805. Cotype. Malanda, Queensland. E. Mjöberg. Exch. Stockholm Mus. 1932.

PHRYNOBATRACHUS ALLENI Parker

1936, Zool. Meded. (Leiden), **19**, p. 91.

11951–60. 11985–90. 20 Paratypes. Plantation No. 3, Du River, Liberia. G. M. Allen. Harvard Med. Sch. Exped. 1926.

11961–70. 70 Paratypes. Paiata, nr. St. Pauls River, Liberia. G. M. Allen. Harvard Med. Sch. Exped. 1926.

PHRYNOBATRACHUS DENDROBATES Boulenger
See P. PETROPEDETOIDES Ahl

PHRYNOBATRACHUS ELBERTI (Ahl)
See HYLARTHROLEPTIS ALBERTI Ahl

PHRYNOBATRACHUS LATIFRONS Ahl. See also P. L. TOGOENSIS Ahl

1924, Zool. Anz., **60**, p. 272.

17536. Cotype. Dodo, French Cameroons. Riggenbach. Exch. Berlin Mus. 1932.

PHRYNOBATRACHUS LATIFRONS TOGOENSIS Ahl=P. LATIFRONS Ahl

1924, Zool. Anz., **60**, p. 273.

17537. Cotype. Kete to Kratje (Kvatschi) Togoland. Graf Zech. Exch. Berlin Mus. 1932.

PHRYNOBATRACHUS MABABIENSIS FitzSimons

1932, Ann. Transvaal Mus., **15**, p. 40.

11716–20. 5 Paratypes. Tsotsoroga Pan, Bechuanaland. Vernay & Lang. Exch. Field Mus. 1932.

PHRYNOBATRACHUS PAKENHAMI Loveridge

1941, Proc. Biol. Soc. Washington, **54**, p. 178.

24568. Type. Machengwe Swamp, Wete, Pemba Id. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

24569–72. 4 Paratypes. Machengwe Swamp, Wete, Pemba Id. R. H. W. Pakenham. R. H. W. Pakenham. 1941.

PHRYNOBATRACHUS PARKERI Witte

1933, Revue Zool. Bot. Afr., **24**, p. 97.

21751–2. 2 Paratypes. Manda, Uele, Belgian Congo. H. Scouteden. Exch. Congo Mus. 1936.

PHRYNOBATRACHUS PETROPEDETOIDES Ahl=
P. DENDROBATES Boulenger

1924, Zool. Anz., **61**, p. 102.

17534–5. 2 Cotypes. W. of Lake Edward, Belgian Congo. R. Graver. Exch. Berlin Mus. 1932.

PHRYNOBATRACHUS STEINDACHNERI Nieden

1910, Arch. Naturg., **76, 1-2**, p. 241.

19577. Cotype. Banjo District, Cameroons. F. W. Riggenbach. T. Barbour. 1933.

PHRYNOBATRACHUS VANROOGENI Hoffman

1940, Soölog. Navor. Nas. Mus. Bloemfontein, **1**, p. 99, fig. 2B.

24509–10. 2 Paratypes. Greytown, Natal. A. C. Hoffman. Exch. Bloemfontein Mus. 1941.

PHRYNOBATRACHUS VERSICOLOR Ahl

1924, Zool. Anz., **61**, p. 100.

17532–3. 3 Cotypes. Rugege Forest, Belgian Ruanda. H. Schubotz. Exch. Berlin Mus. 1932.

PHYLLOBATES CYSTIGNATHOIDES Cope=
SYRRHOPUS CYSTIGNATHOIDES (Cope)

1877, Proc. American Philos. Soc., **17**, p. 89.

25732. Cotype. Potrero, near Cordova, Veracruz, Mexico. F. Sumichrast. Exch. U. S. Nat. Mus. 1944.

PHYLLOBATES FLOTATOR Dunn

1931, Occ. Papers Boston Soc. Nat. Hist., **5**, pp. 389, 392.

9819. Paratype. Suretka, Costa Rica. Dunn & Duryea. T. Barbour. 1923.

9989. Paratype. Las Cascadas, Canal Zone. Panama Exped. T. Barbour. 1924.

10257–62. 6 Paratypes. La Loma, Panama Republic. Dunn & Duryea. T. Barbour. 1923.

10728. Paratype. Barro Colorado Id., Canal Zone. T. Barbour. T. Barbour. 1923.

15289–92. 4 Paratypes. Barro Colorado Id., Canal Zone. E. R. Dunn. E. R. Dunn. 1929.

16006. Type. Barro Colorado Id., Canal Zone. E. R. Dunn. E. R. Dunn. 1929.

16007. 2 Paratypes. Punta Bruja, Panama Republic. J. B. Shropshire. T. Barbour. 1930.

Only the type and one other specimen are mentioned on p. 389, the rest are listed in detail on p. 392.

Phyllodactylus delcampi Mosauer

1936, Copeia, p. 141, figs. 1-6.

42138. Type. Tierra Colorada, Guerrero, Mexico. W. Mosauer. T. Barbour. 1936.

42139. Paratype. Tierra Colorada, Guerrero, Mexico. W. Mosauer. T. Barbour. 1936.

The 2 and 1 are transposed in the type number as printed.

Phyllodactylus gilberti Heller

1903, Proc. Washington Acad. Sci., **5**, p. 61.

46737. Paratype. Wenman Id., Galapagos Ids. Heller & Snodgrass. Exch. Stanford Univ. Mus. 1943.

Phyllodactylus homolepidurus H. M. Smith

1935, Univ. Kansas Sci. Bull., **22**, p. 121, fig. 1A, pl. xxv, fig. 2.

42588. Paratype. Five miles S. W. of Hermosillo, Mexico. E. H. Taylor. Exch. Univ. Kansas. 1936.

Phyllodactylus lanei H. M. Smith

1935, Univ. Kansas Sci. Bull., **22**, p. 125, fig. 1B, pl. xxv, fig. 3.

39899. Paratype. Between Rincon and Cajones, Guerrero, Mexico. Taylor & Smith. Exch. Univ. Kansas. 1936.

PHYLLODACTYLUS LINEATUS RUPICOLUS FitzSimons

1938, Ann. Transvaal Mus., **19**, p. 162.

46818. Paratype. Between O'okiep and Springbok, Little Namaqualand, South Africa. V. FitzSimons. Exch. Transvaal Mus. 1943.

PHYLLOMEDUSA FELTONI Shreve

1935, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 214.

19941. Holotype. Sarayacu, Ecuador. O. C. Felton. T. Barbour. 1933.

PHYLLORHYNCHUS DECURTATUS PERKINSI Klauber

1935, Bull. Zool. Soc. San Diego, No. 12, p. 11, fig. 2.

39677. Paratype. Dry Lake, San Diego Co., California. L. M. Klauber. Exch. L. M. Klauber. 1935.

PHYSALAEMUS FERNANDEZAE L. Müller

1926, Zool. Anz., **65**, p. 193.

17741. Paratype. Christiano Muerto, Buenos Aires Province, Argentina. Merkle. Exch. Munich Mus. 1932.

PHYSIGNATHUS GILBERTI CENTRALIS Loveridge

1933, Proc. New England Zoöl. Club, **13**, p. 71.

35207. Type. Teatree Well, Northern Territory, Australia. W. E. Schevill. Harvard Australian Exped. 1932.

PIPA SNETHLAGEAE L. Müller

1914, Ann. Mag. Nat. Hist. (8), **14**, p. 102.

17734. Paratype. Utinga, near Para, Brazil. E. Snethlage. Exch. Munich Mus. 1932.

PLATYPELIS BARBOURI Noble

1940, Proc. New England Zoöl. Club, **18**, p. 28.

23848.. Type. Fanovana Forest nr. Tananarive, Madagascar. Bt. from W. F. H. Rosenberg. T. Barbour. 1939.

23849. Paratype. Fanovana Forest nr. Tananarive, Madagascar Bt. from W. F. H. Rosenberg. T. Barbour. 1939.

PLATYPLACOPUS DORSALIS (Stejneger)
See TAKYDROMUS DORSALIS Stejneger

PLATYPLACOPUS INTERMEDIUS (Stejneger)
See TAKYDROMUS INTERMEDIUS Stejneger

PLATYSAURUS GUTTATUS FITZSIMONSI Loveridge

1944, Bull. Mus. Comp. Zoöl., **95**, p. 88.

8982. Type. Lydenburg, Transvaal. Exch. British Mus. 1913.

PLATYSAURUS TORQUATUS Peters=P. GUTTATUS TORQUATUS Peters

1879, Sitz. Ges. Naturf. Freunde Berlin, p. 10.

37203. Cotype. Tete, Mozambique. W. Peters. T. Barbour. 1933.

PLATYSAURUS WILHELMI Hewitt=P. GUTTATUS WILHELMI Hewitt

1909, Ann. Transvaal Mus., **2**, p. 29, pl. –.

21448. 1 Paratype. Ubombo, Zululand. —legit 1905. Exch. Natal Mus. 1925.

PLATYTHRYRA FLAVESCENS Agassiz=
KINOSTERNON FLAVESCENS (Agassiz)

1857, Contr. Nat. Hist. U. S., **1**, Part 2, p. 430, pl. v, figs. 12-15.

1918. Cotype. Rio Grande, Texas. N.D.
1919. Cotype. Red River, Arkansas. Capt. Marcy. N.D.

PLECTROHYLA SAGORUM Hartweg

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 437, p. 2.

24538. Paratype. Mt. Ovando, Chiapas, Mexico. N. Hartweg. Exch. Michigan Mus. 1941.

PLETHODON NETTINGI Green

1938, Ann. Carnegie Mus., **27**, p. 295.

24088. Paratype. 1¼ miles S. E. of Cheat Bridge, West Virginia. N. D. Richmond. Don. Carnegie Mus. 1939.

PLETHODON RICHMONDI Netting & Mittleman

1938, Ann. Carnegie Mus., **27**, p. 288, pl. xxx, fig. 1.

24089. Paratype. Ritter Park, Cabell Co., West Virginia. N. D. Richmond. Don. Carnegie Mus. 1939.

PLETHODON WELLERI Walker

1931, Proc. Jun. Soc. Nat. Hist. Cincinnati, Memorial No., p. 3.

17365-6. 2 Paratypes. Grandfather Mts., above 5000 ft., nr. Linville, North Carolina. Weller & Drury. Exch. Junior Nat. Hist. Soc. Cincinnati. 1931.

PLETHOPSIS WRIGHTI Bishop

1937, Herpetologica, **1**, p. 93, pl. ix.

22355-6. 2 Paratypes. 8.7 miles S. E. of Sandy, Clackamas Co., Oregon. S. C. Bishop. Don. S. C. Bishop. 1937.

PLIOCERCUS ANDREWSI H. M. Smith

1942, Proc. Biol. Soc. Washington, **55**, p. 162.

46796. Paratype. Yokdzonot, Yucatan. E. W. Andrews. Exch. Field Mus. Nat. Hist. 1943.

The female paratype formerly F.M.N.H. 36322.

PLIOCERCUS ELAPOIDES SCHMIDTI H. M. Smith

1942, Proc. Biol. Soc. Washington, **55**, p. 161.

26843. Type. Chichen Itza, Yucatan. E. H. Thompson. E. H. Thompson. N.D.

The paratype M. C. Z. 26836 is now in the Chicago Natural History Museum.

PRIONODACTYLUS MARIANUS Ruthven=
EUSPONDYLUS MARIANUS (Ruthven)

1922, Occ. Papers Mus. Zool. Univ. Michigan, No. 103, p. 1.

14651–60. 10 Paratypes. San Pedro, nr. Medellin, Colombia. Hno. Nicéforo Maria. Exch. Michigan Mus. 1921.

PRISTURUS CARTERI TUBERCULATUS Parker

1931, Ann. Mag. Nat. Hist. (10), **8**, p. 515.

32336–7. 2 Cotypes. Rub al Khali, Ain al Rizat, S. Arabia. B. Thomas. Exch. British Mus. 1932.

PRISTURUS CRUCIFER LATICEPHALUS Scortecci=
PRISTURUS CRUCIFER (Valenciennes)

1933, Atti. Soc. Ital. Sci. Nat., **72**, p. 244.

38965. Cotype. Garoe, Italian Somaliland. G. Scortecci. Exch. Milan Mus. 1935.

PRISTURUS SOMALICUS Parker

1932, Proc. Zool. Soc. London, p. 349.

35560–1. 2 Paratypes. Sol Haud, 2500 ft., British Somaliland. R. H. R. Taylor. Exch. British Mus. 1933.

PROBREVICEPS MACRODACTYLUS LOVERIDGEI Parker

1931, Ann. Mag. Nat. Hist. (10), **8**, p. 263.

15701–8. 8 Paratypes. Vituri, Uluguru Mtns., Tanganyika Territory. A. Loveridge. T. Barbour. 1927.

PROBREVICEPS MACRODACTYLUS RUNGWENSIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 387.

16451. Type. Nkuka Forest, Rungwe Mtn., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16452–3. Paratypes. Nkuka Forest, Rungwe Mtn., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

PROCTOPORUS (OREOSAURUS) SHREVEI Parker

1935, Trop. Agric. (Trinidad), **12**, p. 283.

38659. Paratype. Trinidad. N. A. Weber. N. A. Weber. 1935.

PSAMMOPHIS BISERIATUS TANGANICUS Loveridge

1940, Bull. Mus. Comp. Zoöl., **87**, p. 57.

18220. Paratype. Dodoma, Ugogo, Tanganyika Territory. A. Loveridge. T. Barbour. 1924.

18468. Paratype. Ikikuyu, Ugogo, Tanganyika Territory. A. Loveridge. T. Barbour. 1924.

23073–4. 2 Paratypes. Dodoma, Ugogo, Tanganyika Territory. A. Loveridge. Smithsonian Chrysler Exped. 1927.

30371. Paratype. Kilimatinde, Ugogo, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30372–3. 2 Paratypes. Unyanganyi, Turu, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30374–9. 30381–2. 8 Paratypes. Mangasini, Usandawi, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30380. Type. Mangasini, Usandawi, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30383–6. 4 Paratypes. Kikuyu, Ugogo, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

PSEUDACRIS BRIMLEYI Brandt & Walker

1933, Occ. Papers Mus. Zool. Univ. Michigan, No. 272, p. 2.

781. 3 Paratypes. Newbern, North Carolina. J. G. Shute. J. G. Shute. 1863.

PSEUDEMYS DECORATA Barbour & Carr

1940, Mem. Mus. Comp. Zoöl., **54**, p. 409, pl. ix, figs. 3-4.

36851–60. 10 Paratypes. Thomazeau, Haiti. M. Audain. A. V. Armour Exped. 1933.

36861,–3–4. 3 Paratypes. Fond Parisien, Haiti. M. Audain. A. V. Armour Exped. 1933.

36862. Type. Fond Parisien, Haiti. M. Audain. A. V. Armour Exped. 1933.

36865-6. 2 Paratypes. St. Marks, Haiti. M. Audain. A. V. Armour Exped. 1933.

Pseudemys decussata angusta Barbour & Carr

1940, Mem. Mus. Comp. Zoöl., **54**, p. 402, fig. 2.

33948. Paratype. Lake La Deseoda, Pinar del Rio, Cuba. G. S. Villalba. G. S. Villalba. 1932.

34334-6. 3 Paratypes. Rio S. Cristobal, Pinar del Rio, Cuba. F. E. Convillon. T. Barbour. 1933.

34337-9. 3 Paratypes. Rio Taco, Pinar del Rio, Cuba. F. E. Convillon. T. Barbour. 1933.

34340. Type. Rio Taco, Pinar del Rio, Cuba. F. E. Convillon. T. Barbour. 1933.

34341-5. 5 Paratypes. Rio Santa Cruz, Pinar del Rio, Cuba. F. E. Convillon. T. Barbour. 1933.

The last two figures of No. 33948 are transposed in the text.

Pseudemys decussata granti Barbour & Carr

1941, Proc. New England Zoöl. Club, **18**, p. 59.

44854. Paratype. Cayman Brac. Chapman Grant. T. Barbour. 1939.

44855-7. 3 Paratypes. Grand Cayman Id. Chapman Grant. T. Barbour 1939.

46045. Type. Grand Cayman Id. F. R. Benitez. T. Barbour. 1941.

46046. Paratype. Grand Cayman Id. F. R. Benitez. T. Barbour. 1941.

Pseudemys decussata plana Barbour & Carr

1940, Mem. Mus. Comp. Zoöl., **54**, p. 405, fig. 3, pl. viii, figs. 1, 3, 8.

34134. Type. Rio Jobabo, Western Oriente, Cuba. T. Barbour. T. Barbour. 1932.

34128-33. 34135. 7 Paratypes. Rio Jobabo, Western Oriente, Cuba. T. Barbour. T. Barbour. 1932.

Pseudemys felis Barbour

1935, Occ. Pap. Boston Soc. Nat. Hist., **8**, p. 205.

38385. Type. Cat Id., Bahamas. W. G. Albury & C. S. Dolley. T. Barbour. 1935.

38386. Paratype. Cat Id., Bahamas. W. G. Albury & C. S. Dolley. T. Barbour. 1935.

Dolley, not Dooley is the correct spelling.

Pseudemys floridana peninsularis Carr

1938, Copeia, p. 105.

43849. Type. Crystal Springs, Pasco Co., Florida. L. Marchand. A. F. Carr, Jr. 1938.

43850. Paratype. Crystal Springs, Pasco Co., Florida. L. Marchand. A. F. Carr, Jr. 1938.

44069. Paratype. Nr. Woodmere, Sarasota Co., Florida. A. F. Carr, Jr. A. F. Carr, Jr. 1938.

Pseudemys floridana suwanniensis Carr

1937, Occ. Pap. Mus. Zool. Michigan, No. 348, p. 4, pl. 1.

43030. Paratype. Suwannee River, Levy Co., Florida. A. F. Carr, Jr. A. F. Carr, Jr. 1937.

43031. Paratype. Manatee Springs, Levy Co., Florida. A. F. Carr, Jr. A. F. Carr, Jr. 1937.

Pseudemys malonei Barbour & Carr

1938, Proc. New England Zoöl. Club, **17**, p. 76.

44338. Type. Near Northwest Point, Great Inagua Id., Bahamas. B. Shreve. Mus. Exped. 1938.

44339–48. 10 Paratypes. Near Northwest Point, Great Inagua Id., Bahamas. B. Shreve. Mus. Exped. 1938.

Pseudemys nelsoni Carr

1938, Occ. Pap. Boston Soc. Nat. Hist., **8**, p. 307, fig. 1.

39888. Type. St. John's Marsh, Fellsmere, Florida. G. Nelson. G. Nelson. 1936.

43847. Paratype. Sulfur City, Lake Co., Florida. A. F. Carr, Jr. A. F. Carr, Jr. 1938.

43848. Paratype. Lake Neuman, Alachua Co., Florida. A. F. Carr, Jr. A. F. Carr, Jr. 1938.

Pseudemys rubriventris bangsi Babcock

1937, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 293.

7047. Paratype. Boot Pond, Plymouth Co., Massachusetts. F. A. Lucas. F. A. Lucas. 1912.

16777. Paratype. Gunner's Exchange Pond, Plymouth Co., Massachusetts. H. J. Thayer. H. J. Thayer. 1912.

16778. Type. Gunner's Exchange Pond, Plymouth Co., Massachusetts. H. J. Thayer. H. J. Thayer. 1912.

The type and paratype actually came from Gunner's Exchange Pond which is connected with Boot Pond by a narrow channel.

Pseudemys scripta gaigeae Hartweg

1939, Occ. Pap. Mus. Zool. Michigan, No. 397, p. 1.

4550–1. 4 Paratypes. San Pedro, Estado de Coahuila, Mexico. E. Palmer. E. Palmer. 1880.

The paper mentions only 3 paratypes under these numbers.

Pseudemys scripta hiltoni Carr

1942, Amer. Mus. Novit., No. 1181, p. 1, figs. 1-3.

46678. Paratype. Guirocoba, S. E. of Alamos, Sonora, Mexico. J. W. Hilton. Exch. Am. Mus. Nat. Hist. 1942.

Pseudemys stejnegeri vicina Barbour & Carr

1940, Mem. Mus. Comp. Zoöl., **54**, p. 408.

1891–2. 4 Paratypes. "Haiti." D. F. Weinland. D. F. Weinland. 1862.

43651–4. 4 Paratypes. Sosua, Puerto Plata, Santo Domingo. W. J. Clench. Mus. Exped. 1937.

PSEUDOBRANCHUS STRIATUS AXANTHUS Netting & Goin

1942, Ann. Carnegie Mus., **29**, p. 183, pl. i, figs. 1-2.

23735–44. 12 Paratypes. Hale's Siding, Payne's Prairie, Florida. A. F. Carr, Jr. A. F. Carr, Jr. 1938.

PSEUDOCORDYLUS LANGI Loveridge

1944, Bull. Mus. Comp. Zoöl., **95**, p. 73.

46835. Holotype. Mont aux Sources, Drakensberg, Basutoland. H. Lang. Exch. Transvaal Mus. 1943.

PSEUDOCORDYLUS ROBERTSI (Van Dam)
See ZONURUS ROBERTSI Van Dam

PSEUDOPALUDICOLA PUSILLA (Ruthven)
See PALUDICOLA PUSILLA Ruthven

PSEUDOPHRYNE BROOKSI Loveridge = P. GUENTHERI Boulenger

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 59.

13025. Type. Manjimup, Western Australia. W. S. Brooks. T. Barbour. 1927.

13026–31. 6 Paratypes. Manjimup, Western Australia. W. S. Brooks. T. Barbour. 1927.

PSEUDOPHRYNE GUENTHERI Boulenger. See P. BROOKSI Loveridge

PSEUDOPHRYNE OCCIDENTALIS Parker

1940, Novit. Zool., **42**, p. 97.

18301–2. 2 Paratypes. Burara, S. of Kalgoorlie, Western Australia. G. E. Nicholls. Exch. G. E. Nicholls. 1932.

The Museum possesses a series of topotypes, taken with the paratypes but not seen by Parker.

PSEUDOTRITON DURYI Weller=
GYRINOPHILUS PORPHYRITICUS DURYI (Weller)

1930, Proc. Jun. Soc. Nat. Hist. Cincinnati, **1**, Nos. 5-6, p. 6 .

17540. Paratype. Cascade Caves, near Grayson, Carter Co., Kentucky. Dury & Weller. Exch. Junior Soc. Nat. Hist., Cincinnati. 1932.

PSEUDOTRITON MONTANUS DIASTICUS Bishop

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 451, p. 14.

25797. Holotype. Cascade Caverns, Carter Co., Kentucky. S. C. Bishop. Exch. S. C. Bishop. 1944.

PYTHON CURTUS BRONGERSMAI Stull

1938, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 297.

29779. Type. Singapore, Malay Peninsula. C. B. Kloss. Exch. Raffles Mus. 1931.

RANA ALBOLABRIS ACUTIROSTRIS Parker= R. A. PARKERIANA Loveridge

1936, Novit. Zool., **40**, p. 141.

22304. Paratype. Quirimko, 75 km. E. of Amboin, Angola. K. Jordan. Exch. British Mus. 1907.

RANA ALBOLABRIS PARKERIANA Loveridge nom. nov. for
R. A. ACUTIROSTRIS Parker, which see

1941, Proc. U. S. Nat. Mus., **91**, p. 136.

Unfortunately the name *acutirostris* Parker, 1936, was preoccupied by that of *acutirostris* Fatis, 1872 in the genus *Rana*.

RANA BETSILEANA Boulenger=
MANTIDACTYLUS BETSILEANUS (Boulenger)

1882, Cat. Batr. Sal. Ecaud. Brit. Mus., p. 460.

15362. Cotype. E. Betsileo, Madagascar. D. Cowan. Exch. British Mus. 1929.

RANA CHOBIENSIS FitzSimons

1932, Ann. Transvaal Mus., **15**, p. 39.

17715. Paratype. Kasane, Chobe River, Bechuanaland. Vernay & Lang. Exch. Field Mus. 1932.

20794. Paratype. Kasane, Chobe River, Bechuanaland. Vernay & Lang. Exch. Transvaal Mus. 1936.

RANA COOPERI Parker

1930, Proc. Zool. Soc. London, p. 2.

16251. Paratype. Serpent Lake, Wouramboulchi, Ethiopia. J. Omer-Cooper. Exch. British Mus. 1931.

RANA CRASSIPES CRASSIPES Buchholz & Peters
See R. PERPALMATA Witte

RANA CRYPTOTIS Boulenger=
RANA DELALANDII CRYPTOTIS Boulenger

1907, Ann. Mag. Nat. Hist. (7), **20**, p. 109.

19268. Cotype. Ponang Kuma, Dongwenna, Mossamedes, Angola. W. J. Ansorge. Exch. British Mus. 1930.

RANA DELALANDII DELALANDII Tschudi
See R. HIEROGLYPHICA Ahl

RANA DELALANDII CRYPTOTIS Boulenger
See R. CRYPTOTIS Boulenger

RANA FLOWERI Boulenger. See ABRANA COTTI Parker

RANA GRAHAMI Boulenger

1917, Ann. Mag. Nat. Hist. (8), **20**, p. 415.

15360. Cotype. Tongchuan-fu, Yunnan, China. G. Graham. Exch. British Mus. 1929.

The description however states: "Yunnan at Yunnan fu; numerous specimens."

RANA GREENII Boulenger

1904, Spolia Zeylanica, **2**, p. 74.

15361. Paratype. Ceylon. Exch. British Mus. 1929.

RANA HIEROGLYPHICA Ahl = R. DELALANDII DELALANDII Tschudi

1925, Sitz. Ges. Naturf. Freunde Berlin, p. 42.

17539. Paratype. N. Somaliland. Erlanger & Neuman. Exch. Berlin Mus. 1932.

Called cotype by Ahl, but a type is designated.

RANA MACCARTHYENSIS Andersson

1937, Arkiv. Zool., **29A**, No. 16, p. 9, figs. 3-4.

23030. Cotype. MacCarthy Id., Gambia. G. Svensson. Exch. Stockholm High Schoool. 1938.

We have seven other examples of this valid species from four localities in Liberia.

RANA MASCARENIENSIS UZUNGWENSIS Loveridge

1932, Bull. Mus. Comp. Zoöl., **72**, p. 384.

16626. Type. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16627–35. 9 Paratypes. Dabaga, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16636–8. 3 Paratypes. Kigogo, Uzungwe Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

16639. Paratype. Lukungu, Ubena Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

RANA MIADIS Barbour & Loveridge

1929, Bull. Mus. Comp. Zoöl., **69**, p. 143.

14847. Holotype. Little Corn Id., off Nicaragua. J. L. Peters. Museum Exped. 1928.

RANA MICRODISCA DAMMERMANNI Mertens

1929, Zool. Anz., **86**, p. 68.

15811–2. 2 Paratypes. Badjawa, Flores, Dutch East Indies. R. Mertens. Exch. Senckenberg Mus. 1930.

RANA NEUMANNI Ahl

1924, Mitt. Zool. Mus. Berlin, **11**, p. 4.

22331–2. 2 Cotypes. Somaliland. Erlanger & Neumann. Exch. Berlin Mus. 1937.

RANA PERPALMATA Witte=
R. CRASSIPES CRASSIPES Buchholz & Peters

1922, Revue Zool. Afr., **10**, p. 320.

21785. Paratype. Butu-Polo, Mapanga R., Belgian Congo. H. Schouteden. Exch. Congo Mus. 1936.

RANA SEVOSA Goin & Netting

1940, Ann. Carnegie Mus., **28**, p. 137, pl. xii.

15803–6. 4 Paratypes. Jackson Co., Mississippi. Caribbean Biol. Soc. T. Barbour. 1930.

24071. Paratype. Vestry, Jackson Co., Mississippi. M. J. Allen. Exch. Michigan Mus. 1939.

24584. Paratype. Van Cleave, Jackson Co., Mississippi. M. J. Allen. Exch. Carnegie Mus. 1941.

RANA SHINI Ahl = R. SPINOSA David

1930, Sitz. Ges. Naturf. Freunde Berlin, p. 315.

17651. Cotype. Yao shan, N. Kwangsi, China. Shin. Exch. Berlin Mus. 1932.

RANA SPINOSA David. See R. SHINI Ahl

RANA VERNAYI FitzSimons

1932, Ann. Transvaal Mus., **15**, p. 39.

17714. Paratype. Metsimaklaba River, Bechuanaland. Vernay & Lang. Exch. Field Mus. 1932.

RAPPIA MONTANA Angel = HYPEROLIUS MONTANUS (Angel)

1924, Bull. Mus. Hist. Nat. Paris, p. 269.

15333. Cotype. Mt. Kinangop, Aberdare Mtns., Kenya Colony. Alluaud & Jeannel. Exch. Paris Mus. 1929.

RAPPIA UNDULATA Boulenger =
HYPEROLIUS UNDULATUS (Boulenger)

1901, Ann. Mus. Congo, Zool. (1), **2**, p. 4, pl. ii, fig. 2.

15427. Cotype. Lofoi, Katanga, Belgian Congo. C. Lemaire. Exch. British Mus. 1929.

RHACOPHORUS AGLAVEI Methuen & Hewitt
See R. SIKORAE Boettger

RHACOPHORUS DIMBULLAE Shreve

1940, Proc. Biol. Soc. Washington, **53**, p. 105.

20878. Holotype. Queenwood Estate, Dimbulla, Ceylon. W. L. Schofield. T. Barbour. 1933.

RHACOPHORUS ROBUSTUS Boulenger

1909, Ann. Mag. Nat. Hist. (8), **4**, p. 494.

15412. Cotype. Kankau, Formosa Id. H. Sauter. Exch. British Mus. 1929.

RHACOPHORUS SIKORAE Boettger, xii, 1913 =
R. AGLAVEI Methuen & Hewitt, x. 1913

1913, in Voeltzkow, Reise in Ostafrika, **3**, p. 276, pl. xxiii, fig. 4.

17712. Cotype. Moramanga, E. Madagascar. F. Sikora. Exch. Senckenberg Mus. 1932.

This is the first occasion on which *sikorae* has been synonymized.

RHACOPHORUS VERRUCOSUS Boulenger
See PHILAUTUS GRYLLUS M. A. Smith

Rhadinaea aemula Bailey

1940, Occ. Papers Mus. Zool. Univ. Michigan, No. 412, p. 4, pl. i, fig. 3.

42659. Holotype. Omilteme, Guerrero, Mexico. W. W. Brown. T. Barbour. 1937.

Rhadinaea gaigeae Bailey

1937, Copeia, p. 118.

4539. Paratype. Alvarez, San Luis Potosi, Mexico. Edward Palmer. E. Palmer. 1879.

19047. Paratype. Alvarez, San Luis Potosi, Mexico. W. W. Brown. T. Barbour. 1923.

24982. Paratype. Alvarez, San Luis Potosi, Mexico. W. W. Brown. T. Barbour. 1927.

24983. Type. Alvarez, San Luis Potosi, Mexico. W. W. Brown. T. Barbour. 1927.

24984–5. 2 Paratypes. Alvarez, San Luis Potosi, Mexico. W. W. Brown. T. Barbour. 1927.

No. 4539 is now in the Museum of Zoölogy, University of Michigan. Unfortunately in Bailey's paper this number was transposed as 4359 and others as 24892, 24894-95.

Rhadinaea hesperia Bailey

1940, Occ. Papers Mus. Zool. Univ. Michigan, No. 412, p. 8, pl. ii, fig. 3.

42661. Type. Omilteme, Guerrero, Mexico. W. W. Brown. T. Barbour. 1937.

42660. 42662. 2 Paratypes. Omilteme, Guerrero, Mexico. W. W. Brown. T. Barbour. 1937.

Rhadinaea persimilis Dunn

1938, Copeia, p. 197.

19345. Type. La Loma, Panama Republic. Dunn & Duryea. T. Barbour. 1924.

Rhamnophis aethiopissa elgonensis Loveridge

1929, U. S. Nat. Mus. Bull. 151, p. 24.

18198. Type. Yala River, Kenya Colony. H. J. A. Turner. T. Barbour. 1924.

The number is erroneously given in the description as 18189.

RHAMPHIOPHIS CONNALI Parker=R. O. OXYRHYNCHUS Reinhardt

1929, Ann. Mag. Nat. Hist. (10), **4**, p. 450.

31562. Ilorin, S. of Jebba, Southern Nigeria. C. Francis. Exch. British Mus. 1931.

This is the typical western form which, in Uganda, meets with the eastern *R. o. rostratus* Peters of Mozambique.

RHAMPHIOPHIS OXYRHYNCHUS OXYRHYNCHUS Reinhardt
See R. CONNALI Parker

RHINOCHEILUS LECONTEI Baird & Girard =
R. L. LECONTEI Baird & Girard

1853, Cat. N. American Rept., Pt. 1, p. 120.

137. Holotype. San Diego, California. Dr. J. L. LeConte. Mr. Belknap. N. D.

RHINOCHEILUS LECONTEI CLARUS Klauber

1941, Trans. San Diego Soc. Nat. Hist., **9**, p. 308, pl. xiii, figs. 1-2.

46648. Paratype. Borego Valley, San Diego Co., California. J. Wansley. Exch. L. M. Klauber. 1942.

RHODONA NICHOLLSI Loveridge

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 97.

33252. Holotype. Dalgaranger Station, Western Australia. G. E. Nicholls. Harvard Australian Exped. 1931.

RHOPTROPUS BOULTONI Schmidt

1934, Ann. Carnegie Mus., **22**, p. 7, fig. 2, pl. i.

35551–2. 2 Paratypes. Pico Azevedo, Mosamedes, Angola. R. Boulton. Exch. Field Mus. 1933.

38383–4. 2 Paratypes. Pico Azevedo, Mosamedes, Angola. R. Boulton. Exch. Carnegie Mus. 1935.

RIOPA KORATENSIS (M. A. Smith)
See LYGOSOMA KORATENSE M. A. Smith

RIOPA MABUIIFORMIS Loveridge

1935, Bull. Mus. Comp. Zoöl., **79**, p. 12.

40264. Type. Ngatana, Tana River, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40265–73. 9 Paratypes. Ngatana, Tana River, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

RIOPA POPAE Shreve

1940, Proc. New England Zoöl. Club, **18**, p. 21.

44703. Type. Mt. Popa, 1250 metres, Burma. G. Heinrich. T. Barbour. 1938.

44704–7. 4 Paratypes. Mt. Popa, 1250 metres, Burma. G. Heinrich. T. Barbour. 1938.

RIOPA TANAE Loveridge

1935, Bull. Mus. Comp. Zool., **79**, p. 11.;

40251. Type. Kau, Tana River, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40252–9. 8 Paratypes. Kau, Tana River, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40261. Paratype. Witu, N. of Tana River, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40262–3. 2 Paratypes. Golbanti, Tana River, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

SALAMANDRA SUBCRISTATA Schlegel = TRITURUS PYRRHOGASTER (Boie)

1838, Fauna Japon., Rept., Saur. et Batr., p. 125; pl. iv, figs. 1–3, pl. v, figs. 7–8.

21327. Cotype. Japan. Burger. Exch. Leyden Mus. 1935.

SALAMANDRA UNGUICULATA Schlegel = ONYCHODACTYLUS JAPONICUS (Houttyn)

1838, Fauna Japon., Rept., Saur. et Batr., p. 123, pl. v, figs. 1-6.

21320. Cotype. Japan. Burger. Exch. Leyden Mus. 1935.

SALVADORA GRAHAMIAE LINEATA Schmidt

See S. LINEATA Schmidt

SALVADORA HEXALEPIS KLAUBERI Bogert

1945, Amer. Mus. Novit., No. 1285, p. 2, figs. 1–4.

37228–9. 2 Paratypes. La Paz & vic., Lower California. M. L. Cornejo. T. Barbour. 1933.

SALVADORA INTERMEDIA Hartweg

1940, Copeia, p. 256.

33642–4. 3 Paratypes. Chilpancingo, Guerrero, Mexico. W. W. Brown. T. Barbour. 1932.

SALVADORA LINEATA Schmidt=
S. GRAHAMIAE LINEATA Schmidt

1940, Field Mus. Nat. Hist. Zool Series, **24**, p. 148, fig. 15.

13823. Paratype. Brownsville, Texas. R. D. Camp. T. Barbour. 1920.

43910. Paratype. Georgetown, Texas. L. J. Milne. L. J. Milne. 1938.

SAURODACTYLUS FASCIATUS Werner

1931, Sitz. Akad. Wiss. Wien, **140**, **1**, p. 276, pl. i, fig. 1.

29935. Holotype. Djebel Zalagh, Fez, Morocco. F. Werner. T. Barbour. 1931.

SCELOPORUS AENEUS BICANTHALIS H. M. Smith

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 361, p. 6.

14156. Paratype. Mt. Orizaba, 10,000 ft., Mexico. W. S. Blatchley. T. Barbour. 1920.

SCELOPORUS FERRARIPEREZI Cope=
S. FERRARIPEREZI FERRARIPEREZI Cope

1885, Proc. Amer. Philos. Soc., **22**, p. 400 (part).

46922. Cotype. Guanajuato, Mexico. A. Dugés. Exch. U. S. Nat. Mus. 1944.

Sceloporus formosus scitulus H. M. Smith

1942, Proc. U. S. Nat. Mus., **92**, p. 352.

34228. 34230. 2 Paratypes. Chilpancingo, Guerrero, Mexico. W. W. Brown. T. Barbour. 1932.

There are five specimens in the series, why the others were not designated paratypes is not clear.

Sceloporus goldmani H. M. Smith

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 361, p. 5.

46522. Paratype. Charcas, San Luis Potosi, Mexico. C. L. Lundell. Exch. Michigan Mus. 1942.

Used in drafting the description of variational range, but not specifically designated as paratypes.

Sceloporus heterolepis Boulenger

1895, Proc. Zool. Soc. London, 1894, p. 731, pl. xlviii, fig. 4.

32346. Cotype. La Cumbre de los Arrastrados, Jalisco, Mexico. A. C. Buller. Exch. British Mus. 1932.

Sceloporus jarrovii oberon H. M. Smith

1941, Field Mus. Nat. Hist. Zool. Series, **24**, p. 254, fig. 24.

46194-6. 3 Paratypes. Diamond Pass, 7800 ft., Coahuila, Mexico. H. M. Smith. Exch. Field Mus. 1941.

Sceloporus magister zosteromus Cope. See S. zosteromus Cope

Sceloporus merriami annulatus H. M. Smith

1937, Proc. Biol. Soc. Washington, **50**, p. 83.

46523-4. 2 Paratypes. Glenn Springs, Brewster Co., Texas. H. T. Gaige. Exch. Michigan Mus. 1942.

Sceloporus nelsoni Cochran

1923, Journ. Washington Acad. Sci., **13**, p. 185.

32596. Paratype. Nr. Mazatlan, Sinaloa, Mexico. E. A. Goldman. Exch. U. S. Nat. Mus. 1932.

SCELOPORUS OLIGOPORUS Cope=S. SPINOSUS OLIGOPORUS Cope

1864, Proc. Acad. Nat. Sci. Philadelphia, p. 177.

46924. Cotype. Colima, Colima, Mexico. J. Xantus. Exch. U. S. Nat. Mus. 1944.

SCELOPORUS SCALARIS SLEVINI H. M. Smith

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 361, p. 3.

29837–8. 2 Paratypes. Ramsey Canyon, Huachuca Mtns., Arizona. W. W. Brown. T. Barbour. 1929.

SCELOPORUS SPINOSUS OLIGOPORUS Cope
See S. OLIGOPORUS Cope

SCELOPORUS TORQUATUS MUCRONATUS Cope

1885, Proc. Amer. Phil. Soc., **22**, p. 402.

46938. Cotype. Mirador, Vera Cruz, Mexico. Dr. Sartorius. Exch. U. S .Nat. Mus. 1944.

Hobart M. Smith, 1939, regards this as a full species and ignores *torquatus* Weigmann, 1828.

SCELOPORUS ZOSTEROMUS Cope=S. MAGISTER ZOSTEROMUS Cope

1863, Proc. Acad. Nat. Sci. Philadelphia, p. 105.

46939. Cotype. Cape St. Lucas, Lower California, Mexico. J. Xanthus. Exch. U. S. Nat. Mus. 1944.

SCELOPORUS UNDULATUS VIRGATUS H. M. Smith

1938, Occ. Papers Mus. Zool. Univ. Michigan, No. 387, p. 11.

46525–6. 2 Paratypes. Above Santa Maria Mine, Sonora, Mexico. Barry Campbell. Exch. Michigan Mus. 1942.

SCELOPORUS VARIABILIS OLLOPORUS H. M. Smith

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 358, p. 11.

46527. Paratype. San Juanillo, Costa Rica. A. Smith. Exch. Michigan Mus. 1942.

Sceloporus variabilis smithi Hartweg & Oliver

1937, Occ. Papers Mus. Zool. Univ. Michigan, No. 356, p. 1.

43108–9. 46528–9. 4 Paratypes. Quiengola Mtn., Oaxaca, Mexico. Hartweg & Oliver. Exch. Michigan Mus. 1937 & 1942.

Scelotes tetradactylus hemptinnei (Witte)
See Sepsina hemptinnei Witte

Schoutedenella muta Witte

1933, Revue Zool. Bot. Afr., **24**, p. 101.

19420–3. 21801–10. 14 Paratypes. Kando, nr. Tenke, Katanga, Belgian Congo. G. F. de Witte. Exch. Congo Mus. 1933 & 1936.

Scolecophis fumiceps Cope=Tantilla nigriceps fumiceps (Cope)

1860, Proc. Acad. Nat. Sci. Philadelphia, p. 371.

46249. Holotype. "Probably Cuba" *errore*. No history. Returned by U. S. N. M. 1942.

Scincus officinalis cucullata Werner=
S. scincus cucullatus Werner

1914, Sitz. Akad. Wiss. Wien, **123**, Abt. **1**, p. 343.

22353. Cotype. Gabés, Tunisian Sahara, Tunis. A. Weidholz. Bt. of F. Werner. 1926.

22354. Cotype. Tripoli. B. Klaptocz. Bt. of F. Werner. 1926.

The remarks below apply also to this form which is stated to occur in Tripoli, Tunis, and eastern Algeria.

Scincus officinalis lineolata Werner=
S. scincus scincus (Linnaeus)

1914, Sitz. Akad. Wiss. Wien, **123**, Abt. **1**, p. 343.

22352. Cotype. Cairo, Egypt. Bt. of F. Werner. 1926.

This is rather doubtfully a type as no particular specimen was designated, the name being allocated to Egyptian material.

SCINCUS SCINCUS CUCULLATUS Werner
See S. OFFICINALIS CUCULLATA Werner

SCINCUS SCINCUS SCINCUS (Linnaeus)
See S. OFFICINALIS LINEOLATA Werner

SEPSINA HEMPTINNEI Witte=
SCELOTES TETRADACTYLUS HEMPTINNEI (Witte)

1933, Revue Zool. Bot. Afr., **23**, p. 188.

42884–5. 2 Paratypes. Lukafu, Katanga, Belgian Congo. G. F. de Witte. Exch. Congo Mus. 1937.

The reduction to subspecific status was made by the junior author on the basis of a long series of *hemptinnei* which he obtained at Ujiji, Tanganyika Territory.

SCOLECOSAURUS ALLENI PARVICEPS Barbour

1933, Copeia, p. 77.

32345. Holotype. Cannouan Id., Grenadine Is., British West Indies. H. F. Loomis. D. Fairchild. 1932.

SIBON NICHOLSI (Dunn). See SIBYNOMORPHUS NICHOLSI Dunn

SIBYNOMORPHUS NICHOLSI Dunn=SIBON NICHOLSI (Dunn)

1933, Copeia, p. 193.

37884. Holotype. Chagres Midbasin, Panama Republic. Dr. H. C. Clark. T. Barbour. 1933.

Consists of a head only.

SIBYNOPHIS ANNULATUS HONDURENSIS Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 48.

38703. Type. Portillo Grande, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

21201, etc. 9 Paratypes. Various localities in Hondurus Republic, as listed by the describer. In addition there are—

19957–61. 5 Paratype heads from Tela, Honduras Republic.

SIBYNOPHIS ZETEKI Dunn

1930, Occ. Papers Boston Soc. Nat. Hist., **5**, p. 329.

29060. Holotype. Ancon, Canal Zone. J. Zetek. J. Zetek. 1930.

SIREN INTERMEDIA NETTINGI Goin

1942, Ann. Carnegie Mus., **29**, p. 211.

8601–4. 4 Paratypes. Vigo Co., Indiana. W. S. Blatchley. T. Barbour. 1920.

SISTRURUS MILIARIUS BARBOURI Gloyd

1935, Occ. Papers Mus. Zool. Univ. Michigan, No. 322, p. 2.

12510–11. 2 Paratypes. Royal Palm Hammock, Dade Co., Florida. Barbour, Brooks & Mosier. T. Barbour. 1919.

12512. Type. Royal Palm Hammock, Dade Co., Florida. Barbour, Brooks & Mosier. T. Barbour. 1919.

SMINTHILLUS LIMBATUS ORIENTALIS Barbour & Shreve

1937, Bull. Mus. Comp. Zool., **80**, p. 379.

22082. Type. El Yunque de Barocoa, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

22083–9. 7 Paratypes. El Yunque de Barocoa, Oriente, Cuba. P. J. Darlington. Mus. Exped. 1936.

SONORA SEMIANNULATA BLANCHARDI Stickel

1938, Copeia, p. 185.

46514. Paratype. Near Government Spring, Burnham Ranch, Chisos Mtns., Brewster Co., Texas. Blanchard & Carney. Exch. Michigan Mus. 1942.

SPELERPES ORIZABENSIS Blatchley = OEDIPUS ORIZABENSIS (Blatchley)

1893, Proc. U. S. Nat. Mus., **16**, p. 38.

6640. Cotype. S.W. slope of Mt. Orizaba, Mexico. W. S. Blatchley. T. Barbour. 1920.

Sphaerodactylus altavelensis Noble & Hassler

1933, Amer. Mus. Novit., No. 652, p. 7.

45946–7. Paratypes. Alta Vela Id., Dominican Republic. W. G. Hassler. Exch. American Mus. 1941.

Sphaerodactylus argus bartschi Cochran
See S. bartschi Cochran

Sphaerodactylus argus henriquesi Grant

1940, "Jamaica Today," p. 154.

44971. Type. Mandeville, Jamaica. C. Grant. T. Barbour. 1939.
44972–6. Paratypes. Mandeville, Jamaica. C. Grant. T. Barbour. 1939.

Sphaerodactylus bartschi Cochran=
S. argus bartschi Cochran

1934, Smithsonian Misc. Coll., **92**, No. 7, p. 5.

38179. Paratype. Little Cayman Id. P. Bartsch. Exch. U. S. Nat. Mus. 1934.

Sphaerodactylus beattyi Grant

1937, Journ. Dept. Agric. Univ. Puerto Rico, **21**, p. 508, pl. xiv.

46533–4. 2 Paratypes. East end of St. Croix, U. S. Virgin Is. H. L. Beatty. Exch. Michigan Mus. 1942.

Sphaerodactylus danforthi Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 205, pl. xxii, figs. 6-10.

34403. Type. Culebra Id., Porto Rico. C. Grant. T. Barbour. 1933.
34404–13. 62 Paratypes. Culebra Id., Porto Rico. C. Grant. T. Barbour. 1933.
34424–33. 13 Paratypes. Louis Pena Key, Porto Rico. C. Grant. T. Barbour. 1933.

Sphaerodactylus dunni Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 46.

32199. Holotype. Naco River nr. Cofradia, Honduras Republic. R. E. Stadelman. T. Barbour. 1931.

Sphaerodactylus gaigeae Grant

1932, Journ. Dept. Agric. Puerto Rico, **16**, p. 31.

34434–43. 15 Paratypes. 10 km. S. of Canovenas, Porto Rico. C. Grant. T. Barbour. 1933.

A type was designated from "mountains near Yabucoa" but has not been traced. The author had 22 specimens from "mountains between Maunabo and Yabucoa," no special mention being made of Canovenas. Perhaps this series had better be regarded as cotypes seeing that the description was based on a series.

Sphaerodactylus klauberi Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 207, pl. xx, fig. 1, pl. xxiii, fig. 13.

34473. Type. El Yunque, Porto Rico. C. Grant. T. Barbour. 1933.

34474–80. 8 Paratypes. El Yunque, Porto Rico. C. Grant. T. Barbour. 1933.

Others (M. C. Z. 34481–7) from Luquillo; Maricao; and Hiachoatero, collected between January and May 1931, are probably some of the 24 paratypes mentioned in the paper published July, 1931.

Sphaerodactylus lewisi Grant

1940, "The Herpetology of the Cayman Islands," p. 20.

44987. Type. Georgetown, Grand Cayman Id., West Indies. C. B. Lewis. T. Barbour. 1939.

Sphaerodactylus mariguanae Cochran

1934, Smithsonian Misc. Coll., **92**, No. 7,, p. 9.

38178. Paratype. Booby Id., E. of Mariguana Cay, Bahamas. P. Bartsch. Exch. U. S. Nat. Mus. 1934.

Sphaerodactylus nicholsi Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 204, pl. xxiii, fig. 11.

34578. Type. 3 miles W. of Ensenada, Porto Rico. C. Grant. T. Barbour. 1933.

34579–88. 39 Paratypes. 3 miles W. of Ensenada, Porto Rico. C. Grant. T. Barbour. 1933.

Sphaerodactylus parkeri Grant

1939, Copeia, p. 8, fig. 1.

45005. Type. Alligator Pond, S. coast of Jamaica. C. Grant. T. Barbour. 1939.

45006–9. 5 Paratypes. Alligator Pond, S. coast of Jamaica. C. Grant. T. Barbour. 1939.

Sphaerodactylus richardsoni gossei Grant

1939, Copeia, p. 10, fig. 2.

45015. Type. Mouth of Roaring River, Jamaica. C. Grant. T. Barbour. 1939.

45016–7. 2 Paratypes. Mouth of Roaring River, Jamaica. C. Grant. T. Barbour. 1939.

45018. 2 Paratypes. Port Maria, Jamaica. C. Grant. T. Barbour. 1939.

Sphaerodactylus roosevelti Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 203, pl. xxi, figs. 4-5.

34609. Type. Parguera, Porto Rico. C. Grant. T. Barbour. 1933.

34610. Paratype. Parguera, Porto Rico. C. Grant. T. Barbour. 1933.

Sphaerodactylus sabanus Cochran

1938, Proc. Biol. Soc. Washington, **51**, p. 148.

45215–7. 3 Paratypes. Saba Id., Dutch West Indies. S. T. Danforth. Exch. U. S. Nat. Mus. 1938.

SPHAERODACTYLUS TOWNSENDI Grant

1931, Journ. Dept. Agric. Porto Rico, **15**, p. 208, pl. xxiii, fig. 12.

34613. Type. N.E. corner of Cape San Juan, Porto Rico. C. Grant. T. Barbour. 1933.

34614–7. 4 Paratypes. N. E. corner of Cape San Juan, Porto Rico. C. Grant. T. Barbour. 1933.

SPHENOMORPHUS BIGNELLI Schmidt=
LYGOSOMA (S.) BIGNELLI Schmidt

1932, Field Mus. Nat. Hist. Zool. Series, **18**, p. 183.

32192. Paratype. Webster Cove, Kulambangra Id., Solomon Is. K. P. Schmidt. Exch. Field Mus. 1931.

SPHENOMORPHUS JAGORII DIVERGENS Taylor

1929, Bureau of Sci., Manila, No. 17, p. 194.

20134. Cotype. Sumagui, Mindoro, Philippine Islands. E. H. Taylor. Exch. Carnegie Mus. 1925.

20135. 26326–8. 4 Cotypes. Calapan & San Isidio, Mindoro, Philippine Islands. E. H. Taylor. Exch. Carnegie Mus. 1925.

SPHENOMORPHUS LEAE BROOKSI Loveridge=
LYGOSOMA (S.) LEAE BROOKSI (Loveridge)

1933, Occ. Papers Boston Soc. Nat. Hist., **8**, p. 95.

25055. Holotype. Perth, Western Australia. W. S. Brooks. T. Barbour. 1927.

STENOCERCUS JUNINENSIS Shreve

1941, Proc. New England Zoöl. Club, **18**, p. 75.

45820. Type. Huasqui, near Tarma, Dept. Junin, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1941.

45821–2. 2 Paratypes. Huasqui, near Tarma, Dept. Junin, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1941.

STENOCERCUS TACNAE Shreve

1941, Proc. New England Zoöl. Club, **18**, p. 73.

45806. Type. Toquepala Mine, Dept. Tacna, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1941.

45807–8. 2 Paratypes. Toquepala Mine, Dept. Tacna, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1941.

STORERIA DEKAYI TEMPORALINEATA Trapido

1944, American Midland Naturalist, **31**, p. 71.

2843. Paratype. Jalapa, Mexico. Exch. R. Montes de Oca. 1872.

15990. Paratype. Jalapa, Mexico. E. R. Dunn. T. Barbour. 1921.

STORERIA DEKAYI TEXANA Trapido

1944, American Midland Naturalist, **31**, p. 63.

2434. 3 Paratypes. Dallas, Texas. Mr. Boll. Mr. Boll.

3815. 6 Paratypes. Fort McPherson, Nebraska. Dr. Shafist. Peabody Mus., Salem. 1876.

19896. Paratype. Deeming's Bridge, Matagorda Co., Texas. F. W. Wamsley. J. W. P. Jenks. 1891.

43917. Paratype. Georgetown, Texas. L. J. Milne. L. J. Milne. 1938.

STORERIA DEKAYI WRIGHTORUM Trapido

1944. American Midland Naturalist, **31**, p. 57.

80. Paratype. Burlington, Iowa.

125. 2 Paratypes. New Harmony, Indiana. Col. Owen.

360. Paratype. Delphi, Indiana. F. C. Hill Rev. F. C. Hill.

3269. Paratype. Evanston, Illinois. O. Marcy. O. Marcy.

3272. Paratype. Evanston, Illinois. O. Marcy. O. Marcy.

15713. Paratype. Pensacola, Florida. Dr. S. Kneeland. Boston Soc. Nat. Hist. 1917.

22806. Paratype. Pointe au Basil, Ontario, Canada. L. Giovannoli. L. Giovannoli. 1927.

31843. Paratype. Fulton Co., Georgia. H. A. Carter. H. A. Carter. 1931.

SYRRHOPUS CYSTIGNATHOIDES (Cope)
See PHYLLOBATES CYSTIGNATHOIDES Cope

SYRRHOPUS JUNINENSIS Shreve

1938, Journ. Washington Acad. Sci., **28**, p. 406.

22851. Type. Cascas, Dept. Junin, Peru. W. F. Walker, Jr. W. F. Walker, Jr. 1937.

22852–6. 5 Paratypes. Cascas, Dept. Junin, Peru. W. F. Walker, Jr. W. F. Walker, Jr. 1937.

SYRRHOPUS MONTIUM Shreve

1938, Journ. Washington Acad. Sci., **28**, p. 406.

22858. Type. Cascas, Dept. Junin, Peru. W. F. Walker, Jr. W. F. Walker, Jr. 1937.

22859–61. 3 Paratypes. Cascas, Dept. Junin, Peru. W. F. Walker, Jr. W. F. Walker, Jr. 1937.

TAKYDROMUS DORSALIS Stejneger=
PLATYPLACOPUS DORSALIS (Stejneger)

1904, Smithsonian Mus. Coll., **47**, p. 294.

46951–2. Cotypes. Ishigaki Shima, Yaeyama Group, Loo Choo Islands. A. Owston. Exch. U. S. Nat. Mus. 1944.

This species was made genotype of *Apeltonotus* Boulenger, 1917, but synonymized with *Platyplacopus* by Pope, 1935.

TAKYDROMUS INTERMEDIUS Stejneger=
PLATYPLACOPUS INTERMEDIUS (Stejneger)

1924, Occ. Papers Boston Soc. Nat. Hist. **5**, p. 120.

46950. Cotype. Suifu, Szechwan, China. D. C. Graham. Exch. U. S. Nat. Mus. 1944.

TANTILLA NIGRICEPS FUMICEPS (Cope)
See SCOLECOPHIS FUMICEPS Cope

TANTILLA YAQUIA H. M. Smith

1942, Zoologica (New York), **27**, p. 41.

43274. Holotype. Guasaremos, Rio Mayo, Mexico. H. S. Gentry. T. Barbour. 1937.

TAPINURUS SCUTIPUNCTATUS Amaral

1932, Mem. Inst. Butantan, **7**, p. 65, figs. 22–25.

37395. Paratype. Villa Nova, Bahia, Brazil. E. Garbe. Exch. Inst. Butantan. 1934.

See Amaral (1933, Mem. Inst. Butantan, **8**, p. 190) for further discussion on relationship to *Tropidurus*.

TARBOPHIS FALLAX CYPRIANUS Barbour & Amaral

1927, Bull. Antivenin Inst. Amer. (Philadelphia), **1**, p. 27.

22375. Holotype. Cyprus. Exch. British Mus. 1926.

TARBOPHIS FALLAX MCEWANI Schmidt

1939, Field Mus. Nat. Hist. Zool. Series, **24**, p. 82.

45632. Paratype. Hatay, Amouk (Amuq) Plain. C. W. McEwan. Exch. Field Mus. 1940.

TARBOPHIS MARTINI Schmidt

1939, Field Mus. Nat. Hist. Zool. Series, **24**, p. 84.

45608. Paratype. Baghdad, Iraq. H. Field. Exch. Field Mus. 1940.

TEJUS TEJOU CYANOGASTER L. Müller

1928, Zool. Anz., **77**, p. 69.

39981–2. 2 Paratypes. San José de Chiquitos, Bolivia. Chaco Exped. Exch. Munich Mus. 1936.

Telmatobius walkeri Shreve

1941, Proc. New England Zoöl. Club, **18**, p. 79.

24370. Type. Rapi, Dept. Ayacucho, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1939.

24371–9. 12 Paratypes. Rapi, Dept. Ayacucho, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1939.

24380–1. 2 Paratypes. Pajonal, Dept. Ayacucho, Peru. W. F. Walker, Sr. W. F. Walker, Sr. 1939.

Testudo loveridgii Boulenger= Malacochersus tornieri (Siebenrock)

1920, Comptes Rendus Acad. Sci., **170**, p. 263.

39956–7. 2 Cotypes. Dodoma, Ugogo, Tanganyika Territory. A. Loveridge. A. Loveridge. 1935.

Testudo pardalis babcocki Loveridge

1935, Bull. Mus. Comp. Zoöl., **79**, p. 4.

7990. Paratype. Guaso Nyiro, Kenya Colony. G. M. Allen. W. L. Smith. 1909.

18156. Paratype. Arusha, Tanganyika Territory. A. Loveridge. T. Barbour. 1924.

18157. Paratype. Singida, Tanganyika Territory. A. Loveridge. T. Barbour. 1924.

18158. Paratype. Kilosa, Tanganyika Territory. A. Loveridge T. Barbour. 1924.

18160. Paratype. Pwaga, Tanganyika Territory. A. Loveridge. T. Barbour. 1924.

30001. Paratype. Saranda, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

30002. Paratype. Tukuyu, Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

31984. Paratype. Plains nr. Meru River, Kenya Colony. G. M. Allen. W. L. Smith. 1909.

31985. Paratype. Ithanga Hills, Kenya Colony. G. M. Allen. W. L. Smith. 1909.

40003. Type. Mt. Debasien, Karamojo, Uganda. A. Loveridge. Mus. Exped. 1934.

40004. Paratype. Mt. Mbololo, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40005. Paratype. Mt. Mbololo, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

40006. Paratype. Ngatana, Wema, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

TESTUDO VERROXII A. Smith. See CHERSINELLA SCHONLANDI Hewitt

THAMNOPHIS ORDINOIDES HYDROPHILA Fitch

1936, Amer. Midl. Nat. (Notre Dame), **17**, p. 648.

46507. Paratype. Rogue River, Jackson Co., Oregon. Hubbs & Schultz. Exch. Michigan Mus. 1942.

THAMNOPHIS RUTHVENI Hartweg & Oliver

1938, Occ. Papers Mus. Zool. Univ. Michigan, No. 390, p. 1.

46453–4. 2 Paratypes. Tehuantepec, Oaxaca, Mexico. Hartweg & Oliver. Exch. Michigan Mus. 1942.

THORIUS NARISOVALIS Taylor

1941 (1940), Univ. Kansas Sci. Bull., **26**, p. 416, pl. xlvii, fig. 3.

24544. Paratype. Cerro San Felipe, Oaxaca, Mexico. E. H. Taylor Exch. E. H. Taylor. 1941.

See under *Oedipus* also for species referred to Thorius by Taylor.

THORIUS PULMONARIS Taylor

1941 (1940), Univ. Kansas Sci. Bull., **26**, p. 411, figs. 3-4.

24545. Paratype. Cerro San Felipe, Oaxaca, Mexico. E. H. Taylor. Exch. E. H. Taylor. 1941.

THRASOPS JACKSONII SCHMIDTI Loveridge

1936, Proc. Biol. Soc. Washington, **49**, p. 63.

9276. Type. Meru Forest, Kenya Colony. G. M. Allen. Allen, Brooks & Smith. 1910.

TOLUCA CONICA Taylor & Smith

1942, Uni. Kansas Sci. Bull., **28**, p. 340, fig. 5.

42541–4. 4 Paratypes. Omilteme, Guerrero, Mexico. W. W. Brown. T. Barbour. 1942.

Two uncatalogued specimens in same series were intentionally not designated.

TOLUCA LINEATA WETMOREI H. M. Smith

1943, Proc. U. S. Nat. Mus., **93**, p. 489.

45685. Paratype. Vera Cruz, Tequeyutepec, Mexico. D. McH. Forbes. T. Barbour. 1941.

TRETANORHINUS VARIABILIS LEWISI Grant

1940, "The Herpetology of the Cayman Islands," p. 46.

44890. Type. Grand Cayman Id., West Indies. C. B. Lewis. T. Barbour. 1939.

44891–3. 3 Paratypes. Grand Cayman Id., West Indies. C. B. Lewis. T. Barbour. 1939.

TRIMERESURUS, see also BOTHROPS
TRIMERESURUS DUNNI Hartweg & Oliver

1938, Occ. Papers Mus. Zool. Univ. Michigan, No. 390, p. 6.

27813–7. 5 Paratypes. Tehuantepec, Oaxaca, Mexico. W. W. Brown. T. Barbour. 1929.

The authors' assignment of this snake to Trimeresurus is left, but cf. Stejneger and Barbour, 1940, Copeia, pp. 217–218.

TRIMERESURUS LANSBERGI ANNECTENS Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 50.

38782. Type. Subirana Valley, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

38783. Paratype. Subirana Valley, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

TRIMERESURUS SUMATRANUS MALCOLMI Loveridge

1938, Proc. Biol. Soc. Washington, **51**, p. 45.

43604. Type. Sungii River, Mt. Kinabalu, Borneo. J. A. Griswold, Jr. Harvard Primate Exped. 1937.

43605. Paratype. Kenok River, Mt. Kinabalu, Borneo. J. A. Griswold, Jr. Harvard Primate Exped. 1937.

43606. Paratype. Kiau, Mt. Kinabalu, Borneo. J. A. Griswold, Jr. Harvard Primate Exped. 1937.

TRIMERORHINUS TRITAENIATUS MULTISQUAMIS Loveridge

1932, Proc. Biol. Soc. Washington, **45**, p. 84.

18213. Type. Parklands, Nairobi, Kenya Colony. A. Loveridge T. Barbour. 1924.

29429. Paratype. Juja Farm, Kenya Colony. Smithsonian-African Exped. Exch. U. S. Nat. Mus. 1930.

29430. Paratype. Lake Naivasha, Kenya Colony. Smithsonian-African Exped. Exch. U. S. Nat. Mus. 1930.

29431. Paratype. Guaso Nyiro, Kenya Colony. Smithsonian-African Exped. Exch. U. S. Nat. Mus. 1930.

29432. Paratype. Mtito Andei, Kenya Colony. E. Heller. Exch. U. S. Nat. Mus. 1930.

34926. Paratype. Molo, Kenya Colony. C. Akeley. Exch. Field Mus. N. H. 1933.

TRIMETOPON BARBOURI Dunn

1930, Occ. Papers Boston Soc. Nat. **5**, p. 331.

23877. Type. Pedro Miguel, Canal Zone. Health Dept., Canal Zone. T. Barbour. 1927.

23873–6. 4 Paratypes. Ancon, Canal Zone. Health Dept., Canal Zone. T. Barbour. 1927.

TRIMETOPON SIMILE Dunn

1930, Occ. Papers Boston Soc. Nat. Hist., **5**, p. 331.

15263. Holotype. Reventazon, Costa Rica. Exch. Mus. Nac. de Costa Rica. 1921.

TRITURUS GRANULOSUS MAZAMAE Myers

1942, Copeia, p. 80.

25560. Paratype. Crater Lake on higher slopes of Mt. Mazama, Klamath Co., Oregon. J. P. Heath. Exch. Mus. Vert. Zool., Cal. 1942.

TRITURUS GRANULOSUS TWITTYI Bishop

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 451, p. 16, pl. i, figs. 4-5.

25582–3. 2 Paratypes. Saratoga, California. S. C. Bishop & V. C. Twitty. Exch. S. C. Bishop. 1942.

TRITURUS PERSTRIATUS Bishop

1941, Occ. Papers Mus. Zool. Univ. Michigan, No. 451, p. 16, pl. i, fig. 2.

25559. Paratype. Near Gainesville, Alachua Co., Florida. A. F. Carr, Jr. Exch. Michigan Mus. 1942.

25584–5. 2 Paratypes. Dedge Pond, Okefinokee Swamp, Georgia. S. C. Bishop & M. Wright. Exch. S. C. Bishop. 1942.

TRITURUS PYRRHOGASTER (Boie)
See SALAMANDRA SUBCRISTATA Schlegel

TRITURUS SIERRAE Twitty

1942, Copeia, p. 65, pls. i, iii-v.

25561–3. 2 Paratypes. Near Chico, Butte Co., California. Twitty & Myers. Exch. Mus. Vert. Zool., Cal. 1942.

TROGONOPHIS WIEGMANNI Kaup
See T. W. MAROCCANA Werner

TROGONOPHIS WIEGMANNI MAROCCANA Werner = T. WIEGMANNI Kaup

1931, Sitz. Akad. Wiss. Wien, **140, 1**, p. 280.

29668. Type. Chella, nr. Rabat, French Morocco. F. Werner. T. Barbour. 1931.

29669. Paratype. Djebel Taghat, Fez, French Morocco. F. Werner. T. Barbour. 1931.

29670. Paratype. Agadir, French Morocco. F. Werner. T. Barbout. 1931.

Reasons for synonymizing *maroccana* will be found in a recent revision of the Amphisbaenidae (1941, Bull. Mus. Comp. Zoöl., **87**, p. 363).

TROPIDONOTUS GODMANI Boulenger=NATRIX GODMANI (Boulenger)

1896, Cat. Snakes Brit. Mus., **3**, p. 600.

28466. Cotype. Omilteme, Guerrero, Mexico. H. H. Smith. Exch. British Mus. 1929.

TROPIDOPHIS MACULATUS PILSBRYI Bailey

1937, Proc. New England Zoöl. Club, **16**, p. 42.

9884. Paratype. Guantanamo, Cuba. C. T. Ramsden. C. T. Ramsden. 1914.

TROPIDOPHIS MACULATUS STULLI Grant

1940, "Jamaica Today," p. 158.

44870. Type. Portland Point, Jamaica. C. Grant. T. Barbour. 1939.

44871–2. Paratype. Portland Point, Jamaica. C. Grant. T. Barbour. 1939.

TROPIDOPHIS MELANURUS PARKERI Grant. See T. PARKERI Grant

TROPIDOPHIS PARDALIS BARBOURI Bailey

1937, Proc. New England Zoöl. Club, **16**, p. 49.

37892–4. 3 Paratypes. Clarencetown, Long Id., Bahamas. T. Barbour. T. Barbour. 1934.

37895–900. 6 Paratypes. Mortimer's Point, Long Id., Bahamas. T. Barbour. T. Barbour. 1934.

37913. Type. Bannermantown, S. Eleuthera Id., Bahamas. T. Barbour. T. Barbour. 1934.

37902–12. 37914–24. 22 Paratypes. Bannermantown, S. Eleuthera Id., Bahamas. T. Barbour. 1934.

39484–90. 7 Paratypes. Arthurstown, Cat. Id., Bahamas. W. J. Clench. Mus. Exped. 1935.

42250–57. 8 Paratypes. Clarencetown, Long Id., Bahamas. R. McLean. Mus. Exped. 1936.

42258–64. 7 Paratypes. Simms, Long Id., Bahamas. R. McLean. Mus. Exped. 1936.

Tropidophis pardalis greenwayi Barbour & Shreve

1936, Proc. New England Zoöl. Club, **16**, p. 2.

42051. Type. Ambergris Cay, Caicos Ids., Bahamas. J. C. Greenway, Jr. Mus. Exped. 1936.

42052. Paratype. Ambergris Cay, Caicos Ids., Bahamas. J. C. Greenway, Jr. Mus. Exped. 1936.

Tropidophis pardalis stejnegeri Grant

1940, "Jamaica Today," p. 158.

44769. Holotype. Boston Bay between Port Antonio and Manchimeal, Jamaica. C. Grant. T. Barbour. 1939.

Tropidophis parkeri Grant = T. melanurus parkeri Grant

1940, The Herpetology of the Cayman Islands, p. 44.

44865. Type. Little Cayman Id., West Indies. C. Grant. T Barbour. 1939.

44866–8. 3 Paratypes. Little Cayman Id., West Indies. C. Grant. T. Barbour. 1939.

The paratypes listed above are not so designated but are part of the series of 6 in the "writer's collection" referred to on p. 46.

Tropidophorus darlingtoni Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 47.

47051. Type. Mount Wilhelm, 5,000–6,000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

47052–3. 2 Paratypes. Mount Wilhelm, 5,000–6,000 ft., Bismarck Range, New Guinea. P. J. Darlington. Capt. P. J. Darlington. 1944.

TROPIDURUS PICTUS L. Müller

1924, Mitt. Zool. Mus. Berlin, **11**, p. 85.

37202. Cotype. Upper Pilcomayo, Bolivia. Herrmann. T. Barbour. 1933.

TYPHLOPS ATER SUTURALIS Brongersma

1934, Zool. Meded. (Leiden), **17**, p. 196, fig. 26.

33505. Paratype. Soa Konorra, Halmahera Id. W. Kukenthal. Exch. Senckenberg Mus. 1932.

TYPHLOPS ENDOTERUS Waite. See T. LEONHARDI Sternfeld

TYPHLOPS GRANTI Ruthven & Gaige

1935, Occ. Papers Mus. Zool. Univ. Michigan, No. 307, p. 1, fig. 1.

38301-2. 2 Paratypes. Cajade Muertos, 8 miles off Poncé, Porto Rico. C. Grant. T. Barbour. 1935.

TYPHLOPS KAIMOSAE Loveridge

1935, Bull. Mus. Comp. Zoöl., **79**, p. 5.

40060. Type. Kaimosi, Kakamega, Kenya Colony. A. Loveridge. Mus. Exped. 1934.

TYPHLOPS KATANGENSIS Witte

1933, Revue Zool. Bot. Afr., **23**, p. 190.

42896. Paratype. Lukafu, Katanga, Belgian Congo. G. F. de Witte. Exch. Congo Mus. 1937.

TYPHLOPS LEONHARDII Sternfeld = T. ENDOTERUS Waite

1919, Senckenbergiana, **1**, p. 77.

22082. Cotype. Hermannsburg, Finke River, Central Australia. M. Leonhardi. Exch. Senckenberg Mus. 1926.

TYPHLOPS MUCRONATUS Boettger

1880, Zool. Anz., **3**, p. 279.

33504. Cotype. Zukube, Nossi Bé, Madagascar. Stumpff & Ebenau. Exch. Senckenberg Mus. 1932.

Though clearly labeled "paratype" by Senckenberg Museum, its status is very doubtful for the original description calls for two cotypes, and our specimen bears the date 1881, i.e. the year after publication.

TYPHLOPS PLATYRHYNCHUS Sternfeld

1910, Mitt. Zool. Mus. Berlin, **5**, p. 69.

39798. Cotype. Tanga, Tanganyika Territory. Martienssen. Exch. Berlin Mus. 1936.

TYPHLOPS SCHLEGELII SCHLEGELII Bianconi
See ONYCHOCEPHALUS DINGA Peters

TYPHLOPS STADELMANI Schmidt

1936, Proc. Biol. Soc. Washington, **49**, p. 48.

38701. Holotype. Subirana Valley, Honduras Republic. R. E. Stadelman. T. Barbour. 1935.

TYPHLOPS TETTENSIS RONDOENSIS Loveridge

1942, Bull. Mus. Comp. Zoöl., **92**, p. 256.

48066. Type. Nchingidi, Rondo Plateau, Tanganyika Territory. A Loveridge. Mus. Exped. 1939.

48067–9. 3 Paratypes. Nchingidi, Rondo Plateau, Tanganyika Territory. A. Loveridge. Mus. Exped. 1939.

TYPHLOPS TOVELLI Loveridge

1945, Proc. Biol. Soc. Washington, **58**, p. 111.

48844. Type. Koonowarra Sports Ground, Darwin, N. T. Australia, T. R. Tovell. T. R. Tovell. 1945.

48845. Paratype. Koonowarra Sports Ground, Darwin, N. T. Australia. T. R. Tovell. T. R. Tovell. 1945.

TYPHLOPS VERMIS Boulenger=T. ZENKERI Sternfeld

1914, Ann. Mag. Nat. Hist. (8), **14**, p. 482.

28465. Cotype. Bitye, French Cameroons. G. L. Bates. Exch. British Mus. 1929.

Boulenger (1915) himself synonymized this species with *zenkeri* Sternfeld (1908).

TYPHLOPS ZENKERI Sternfeld. See T. VERMIS Boulenger

UROMASTIX MACFADYENI Parker

1932, Proc. Zool. Soc. London, p. 353.

33596. Paratype. Berbera, 400 ft., British Somaliland. G. W. Bury. Exch. British Mus. 1932.

UROMASTIX PHILBYI Parker

1938, Ann. Mag. Nat. Hist. (11), **1**, p. 484.

44760. Paratype. Between Mecca & Shabwa, S. Arabia. H. St J. B. Philby. Exch. British Mus. 1938.

UTA CAERULEA H. M. Smith

1935, Univ. Kansas Sci. Bull., **22**, p. 172, pl. xxvi, fig. 2.

39900. Paratype. 30 miles N. of Chihuahua City, Chihuahua, Mexico. Dunkle and Smith. Don. Univ. Kansas. 1936.

UTA ORNATA SCHMIDTI Mittleman

1940, Herpetologica, **2**, p. 33, pl. iii, fig. 1.

45589. Paratype. Colonia Garcia, Chihuahua, Mexico. T. Barbour. 1910.

46943. Paratype. 6 miles N. W. of Alpine, Brewster Co., Texas. L. Hoyle. Exch. U. S. Nat. Mus. 1944.

UTA STANSBURIANA NEVADENSIS Ruthven=
U. S. STANSBURIANA Baird & Girard

1913, Proc. Bull. Soc. Washington, **26**, p. 27, fig. 1.

46530–1. 2 Paratypes. Moleen Canyon, River Range, Nebraska. A. G. Ruthven. Exch. Michigan Mus. 1942.

UTA STANSBURIANA STANSBURIANA Baird & Girard
See U. S. NEVADENSIS Ruthven

UTA TAYLORI H. M. Smith

1935, Univ. Kansas Sci. Bull., **22**, p. 158, pl. xxvi, fig. 3.

39901. Paratype. 10 miles N. W. of Guaymas, Sonora, Mexico. E. H. Taylor. Don. Univ. Kansas. 1936.

VARANUS SCUTIGERULUS Barbour

1932, Proc. New England Zoöl. Club, **13**, p. 1.

32264. Holotype. Kampong Ulu, Madalam River, Sarawak, Borneo. H. W. Smith. Exch. Sarawak Mus. N. D.

VERTICARIA PICTA Van Denburgh & Slevin=
CNEMIDOPHORUS HYPERYTHRUS PICTUS (Van Denburgh & Slevin)

1921, Proc. California Acad. Sci., **11**, p. 98.

15564. Paratype. Montserrate Id., Gulf of California. J. R. Slevin. Exch. Californian Acad. 1921.

XENOPUS LAEVIS BOREALIS Parker

1936, Ann. Mag. Nat. Hist. (10), **18**, p. 596, figs. 11-13.

22302. Cotype. Boma Waterhole, Marsabit, Kenya Colony. V. E. Fuchs. Exch. British Mus. 1937.

22303. Cotype. Cave at 6000 ft., Mt. Elgon, Kenya Colony. F. W. Edwards. Exch. British Mus. 1937.

XENOPUS LAEVIS BUNYONIENSIS Loveridge

1932, Proc. Biol. Soc. Washington, **45**, p. 114.

10288–92. 5 Paratypes. Kissolo Market, Kigezi District, Uganda. Bt. in Market. J. C. Phillips. 1924.

14616. Type. Bufundi, Lake Bunyonyi, Uganda. J. C. Bequaert. Harvard Med. Sch. Exped. 1927.

14617. Paratype. Bufundi, Lake Bunyonyi, Uganda. J. C. Bequaert. Harvard Med. Sch. Exped. 1927.

The 5 paratypes are dried but the Museum possesses a good series of topotypes of this dwarf form from the montane lake district.

XIPHOCERCUS DARLINGTONI Cochran

1935, Proc. Boston Soc. Nat. Hist., p. 373.

38251. Holotype. Roche Croix, Massif de la Hotte, Haiti. P. J. Darlington. Mus. Exped. 1934.

ZAMENIS VARIABILIS Boulenger=COLUBER VARIABILIS (Boulenger)

1905, Ann. Mag. Nat. Hist. (7), **16**, p. 178.

28468. Cotype. El Kubar, South Arabia. G. W. Burg. Exch. British Mus. 1929.

ZAOCYS DHUMNADES MONTANUS Pope

1928, Amer. Mus. Novit., No. 325, p. 2.

45964–5. 2 Paratypes. Chungan Hsien, Yenping, China. C. H. Pope. Exch. American Mus. 1941.

ZONURUS BARBERTONENSIS DEPRESSUS FitzSimons=
CORDYLUS WARRENI DEPRESSUS (FitzSimons)

1930, Ann. Transvaal Mus., **14**, pp. 24, 29.

41869. Paratype. Newgate Farm, nr. Louis Trichardt, Zoutpansberg Mountains, Transvaal. A. Roberts. Exch. Transvaal Mus. 1936.

Zonurus campbelli FitzSimons = Cordylus campbelli (FitzSimons)

1938, Ann. Transvaal Mus., **19**, p. 189.

46824. Paratype. Barby Farm, Great Namaqualand, South West Africa. V. FitzSimons. Exch. Transvaal Mus. 1943.

Zonurus cordylus rhodesianus Hewitt = Cordylus c. rhodesianus (Hewitt)

1933, Occ. Papers Rhod. Mus. Bulawayo, **2**, p. 48, pl. ix, fig. 3.

33448. Cotype. Monte Cassino, Macheke, Southern Rhodesia. K. Tasman. Exch. Albany Mus. 1932.

Zonurus cordylus tasmani Power = Cordylus c. tasmani (Power)

1930, Ann. Transvaal Mus., **14**, pp. 12, 16, pl. i, fig. 4.

31571–2. 2 Paratypes. Dunbrody, Sundays River, Cape Province, S. Africa. Rev. Fr. McGinty. Exch. Albany Mus. 1921.

Zonurus robertsi van Dam = Pseudocordylus robertsi (van Dam)

1921, Ann. Transvaal Mus., **7**, p. 241, pl. iv.

21230. Paratype. Klaver, van Rhynsdorp District, Cape Province, S. Africa. A. Roberts & A. Adendorff. Exch. Transvaal Mus. 1925.

Zonurus ukingensis Loveridge = Cordylus ukingensis (Loveridge)

1932, Bull. Mus. Comp. Zoöl., **72**, p. 378.

30761. Holotype. Tandala, Ukinga Mtns., Tanganyika Territory. A. Loveridge. Mus. Exped. 1930.

Zonurus vandami FitzSimons = Cordylus vandami (FitzSimons)

1930, Ann. Transvaal Mus., **14**, pp. 25, 30, figs. 6-7.

41876. Paratype. Gravelotte, nr. Leydsdorp, Transvaal. G. van Dam. Exch. Transvaal Mus. 1936.

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. 96, No. 3

THE GENERA OF FOSSIL CONCHOSTRACA — AN ORDER OF BIVALVED CRUSTACEA

By PERCY E. RAYMOND

WITH SIX PLATES

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No. 3.—*The Genera of Fossil Conchostraca—an Order of Bivalved Crustacea*[1]

By Percy E. Raymond

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[1]Published with the aid of a special gift from Mr. G. R. Agassiz.

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INTRODUCTION

Dr. Frank M. Carpenter and Mr. Gilbert O. Raasch, while collecting Permian insects in Oklahoma, found many remarkably well preserved specimens of what are usually called Estheriidae. Mr. Raasch had intended to describe them, but since he has joined the armed forces, they have been turned over to me. I am indebted to these gentlemen for the privilege, but they handed me a problem for which there may be no satisfactory solution. A job which I thought would take about three weeks has occupied me for nearly two years, and most of the American species still await description. My efforts at this time have been confined to an attempt to describe the characteristics of the genera, and to list under them their various species. The study has necessarily been largely from the literature, and is subject to revision. Many of the published descriptions and figures are far from satisfactory. I have listed the described species in all cases where I could find the place of publication, but there are half a dozen mentioned by various authors who gave no data, and I have doubtless missed some papers, perhaps some important ones. My chief purpose in publishing this article at the present time is to point out that what paleontologists have called Estheria is not an Estheria, and that there are several easily recognizable genera in the complex which has passed under that name.

I am especially indebted to Professor Frank M. Carpenter, who not only furnished the specimens but made the photographs for the illustrations. Nor should I fail to mention the services of the librarians in the Museum of Comparative Zoölogy, who have been most helpful in hunting up obscure references and getting books from other libraries.

Relatively little attention has been paid to "Estherias" in North America, except for those in the Triassic of Pennsylvania, Virginia, and North Carolina. Even these are poorly differentiated and need reexamination. It is, however, known that conchostracons are present in our Devonian, Carboniferous, and Permian strata, and they are well worth study. Even this preliminary investigation shows that some of the genera have restricted vertical ranges, and a more critical study of the species would probably show that they are really useful in correlation and in the identification of particular strata. A great desideratum in the study of non-marine formations is a group which is widespread, and which contains species which are definitely identifiable. Pruvost has used the Conchostraca to a certain extent in France and Belgium, but he and other workers have been handicapped by the extremely generalized work of T. Rupert Jones, who for many years dominated this field and who had liberal ideas as to what constituted a species.

As an appendix to this introduction, for it had to be tucked in somewhere, I would add that I have adopted the transliteration Chernyshev, which Dr. Nabokov tells me is the correct one, for the famous and really productive Russian who is listed in bibliographies more commonly as Tchernyshev, or Tchernychev, or more rarely as Tschernychev. For many years the Russians were more familiar with French or German than with English, and unfortunately the transliterations differ in the three languages.

ESTHERIA A HOMONYM

Paleontologists seem to have overlooked the fact that the generic name Estheria was first used for a fly from Nova Scotia by J. B. Robineau-Desvoidy in the year 1830.[1] The genotype is *E. tibialis*, a species found not only in Nova Scotia but in New England. Professor C. T. Brues tells me that it is, curiously enough, an insect parasitic on crustaceans.

In 1837, H. Straus-Dürchheim published an article[2] in which he described the genus Estheria, which he credited to E. Rüppell. Rüppell's name appears in print after the generic name, but the only portion of the paper which he actually signed is a paragraph appended

[1] Memoires presentés par divers savants a L'Académie Royal des Sciences de L'Institute de France, et imprimés par son ordre. Sciences Mathematique et Physiques. Tome deuxième 1830, p. 305.

[2] Abh. Senckenbg. Mus. vol. 2, pp. 117 and 126, 1837.

in square brackets. Most authors quote Estheria Rüppell, but some mention Estheria Straus-Dürchheim. It is of no moment now as to whom the name is to be ascribed, for it is obviously preoccupied. C. Rondani in his monograph of the Diptera of Italy, Vol. 5, 1862, p. 60, changed the spelling to Esteria, a fact of importance only to entomologists. The type of the crustacean called Estheria was *E. dahalacensis* Rüppell (or Straus-Dürchheim), a species which is found in the "Susswasser-sumpfen" on islands off the coast of Abyssinia, or what was Abyssinia in 1837. The popularity of the biblical Esther among the inhabitants of that region inspired the name.

A great many years passed before the fact that the name Estheria could not be used for a crustacean caused zoölogists any concern. It was not until 1898 that G. O. Sars gave the generic name Leptestheria to the group of which *E. dahalacensis* is the type. Two other genera, Cyzicus and Isaura were proposed in early days for "Estheria"-like crustaceans, but apparently do not precede Leptestheria. Isaura was preoccupied when proposed in 1842 by Joly,[1] having been used in 1826 by Victor Andovin,[2] but credited to Jules-Cesar Savigny, for a group of hexacorals. Savigny, however, used the French form Isaures, and it was not till 1844 that Agassiz[3] changed the name to Isaura.

It is a question whether Isaura is a properly described genus, either as a coral or a crustacean, but the matter is of little interest to the paleontologist, for the species involved are all modern.

Some writers have maintained that since Estheria Rüppell is preoccupied, Cyzicus should replace it. This name was proposed by J. V. Audouin,[4] who did not describe the genus, but assigned to it the two species, *Cyzicus bravaisii* nov. and *Limnadia tetracerus* Krynicki. Since the former appears never to have been described, *Limnadia tetracerus,* which is well known, is the genotype.[5] It is not at all like Rüppell's typical species of "Estheria," and cannot take the place of that name. For some reason, von Zittel[6] cited this genus with the spelling Cyziscus.

[1] Ann. des Sciences Naturelles, second series, vol. 17, 1842, p. 293.

[2] Description de l'Egypte, vol. 1, pt. 4, 1826, 229.

[3] Nomenclator Zoölogicus, 1844, Polypi, p. 14.

[4] Ann. Soc. Ent. de France, vol. 6, 1837, Bulletin (placed after last cover in M.C.Z. bound copy), p. x.

[5] Daday de Deés (Ann. des Sci. Naturelles, ser. 9, vol. 20, 1915, p. 278) unfortunately placed this species in his subgenus Gymnocyzicus.

[6] Handbuch Paleont., vol. 2, fasc. 8, 1885, p. 567.

MODERN CONCHOSTRACA

The most extensive work on recent conchostracans is that of Jenö Daday, otherwise known as Eugen von Daday, or Eug. Daday de Deés. He was a professor at the Superior Polytechnical School at Budapest, and published an elaborate memoir on the Cladocera, as well as shorter papers on other groups. His monograph of the Conchostraca was first published in 1913 in Magyar tudomanyos Akademia, Budapest, Matematika és természethedományi osztaley Ertekezések a termeszett, Köréból, vol. 31, pp. 559–601; vol. 32, pp. 49–145. This is in Hungarian, but the families and genera described can be gleaned from the Zoölogical Record, Volume for 1914. The work was republished with additions and deletions in Latin and French (and a little English) in the Annales des Sciences Naturelles, Paris, vol. 20, ser. 9, 1915, pp. 39–330; vol. 6, ser. 10, 1923, pp. 255–390; vol. 8, ser. 10, 1925, pp. 143–184; vol. 9, ser. 10, 1926, pp. 1–81; and vol. 10, 1927, pp. 1–112.

Unfortunately Daday died before this series was finished, so that the bibliography, to which constant reference is made, was omitted.

A list of the families and genera of the modern forms according to Daday is here appended to give paleontologists an idea of the variety of these crustaceans now living.

Family CAENESTHERIIDAE Daday de Deés

Genera, Caenestheria Daday de Deés, Caenestheriella Daday de Deés, Cyzicus Audouin, Eocyzicus Daday de Deés; Subgenera of Cyzicus, Trichocyzicus and Gymnocyzicus.

Family LYNCEIDAE Stebbing

Daday de Deés credits this name to Sayce, although it seems to have been proposed first by Baird for a group of Notostraca in which the genus Lynceus was not included. Stebbing appears to have been the first to place it on a proper footing.

Genera, Lynceus Müller (synonyms are Limnetis Lovén, Hedessa Lièvin), Lynceiopsis Daday de Deés. Subgenus of Lynceus, Eulynceus Daday de Deés.

Family LIMNADIIDAE Sars

Genera, Limnadia Brongniart, Eulimnadia Packard, Limnadella Girard, Limnadopsis Spencer and Hall.

Family CYCLESTHERIIDAE Sars

Genus, Cyclestheria Sars.

Family LEPTESTHERIIDAE Daday de Deés

Genera Leptestheria Sars. The genotype is *Estheria dahalacensis* Rüppell, (or Strauss-Dürcheim), hence for modern species, this name replaces Estheria. Eoleptestheria Daday de Deés, Leptestheriella Daday de Deés.

De Deés' papers include descriptions of 152 species, almost half of which, 74, belong to the Caenestheriidae, whereas the Cyclestheriidae are represented by only a single species.

It should be remembered that this classification was proposed about thirty years ago, and some genera and species have been described since. A later important paper is that of K. H. Barnard in the Annals of the South African Museum, vol. 29, 1929, pp. 181 to 272.

In general, the classification of these animals is based upon the structure of the head and appendages, the shells being much alike. In fact, Daday de Deés gives a long list of species, and some genera which he says are incompletely known, and hence referred to particular genera and families with doubt. These are species described from the shells only. In some cases, he goes so far as to say that real identification is not possible unless both the males and females are known.

Few Paleozoic specimens retaining any traces of appendages have been found, and we have no sure way of distinguishing males from females. At the present time it would be unsafe to place any of the Paleozoic fossils in modern genera.

In only three instances have specimens with appendages been found, so far as I can learn. First are those described by Ph. C. Bill[1] from the Bunter sandstone of Alsace, and others by Miss Mabel Wright[2] from the Coal Measures of Kilkenny, Ireland.

Bill's specimens were poor, but those of Miss Wright are well preserved and of great interest. More recently Chernyshev has described a few Jurassic specimens of *Lynceus stuchukini* with fragments of appendages.

BASIS FOR DESCRIPTIONS OF THE FOSSILS

Lacking appendages and other unpreservable anatomical features, the fossils must be classified on the basis of the carapace. Unfortun-

[1] Mitt. der Geol. Landesanstalt von Elsass-Lothringen, vol. 8, 1914, p. 326, fig.
[2] Proc. Roy. Irish Acad., vol. 35, 1920, Sect. B, No. 9, p. 187, figs. 1–5, pls. 24, 25.

ately, the shells have few striking features. The outline of the valves, the curvature of the hinge, the position of the umbo, the presence or absence of a muscle scar, the spacing of the growth-lines, or concentric ridges, the presence or absence of radial markings, and the minute markings on the shell, reticulations, spinules, or puncta, are the only characteristics which the paleontologist can study.

Looking over the modern forms, (illustrated by Daday de Deés) on the basis of the characteristics listed above, it seems that all of the Caenestheriidae and two of the genera of the Leptestheriidae would be assigned to a single genus if known only as fossils. Leptestheria itself could be identified by its elongate, sub-rectangular shape. The Lynceidae lack growth lines, and the Limnadiidae have only a few. In the latter family the muscle scars are well developed and surrounded by a raised line except in Limnadopsis. In this genus the spines along the hinge are conspicuous. All the above have the umbos near the anterior end and have a more or less oval form. The last group, the Cyclestheriidae, have the umbo even further forward, so that the carapace is almost circular in outline, and there are few growth lines.

In the attempt which follows, the writer has employed various combinations of the shape of the carapace and the features of the surface. The outline may be circular, sub-circular, ovate, obovate, or subquadrate; the hinge may be straight or curved, the beak may be sub-central or in any position from that to really anterior; the axis of the greatest length may be parallel to the length or oblique.

As for the surface features, the concentric markings may consist of striae, lirae, costellae, costae, or undulations; these may be few or numerous, and the first one may be close to or at some distance from the beak. The radial markings may extend over the whole shell, or may be confined to the spaces between the concentric ones. In the latter case they are usually spoken of as "ornamentation." Many show no ornamentation except puncta; others have regular polygons, irregular polygons, irregular radial striae with ridges between them, and a few have regular radial lirae interrupted by the concentric markings.

These various features appear to have different taxonomic values in the various genera. The classification is necessarily artificial, and I have been conservative in erecting new genera. I have seen opportunities for many more, but have felt that since I was working chiefly from the literature, it would be better to make a bare outline to be revised by later students who have access to more material. In most cases I have made but the briefest possible notes about species,

giving only enough to provide some justification for the generic reference. It is now 84 years since Jones presented his Monograph to the Palaeontographical Society. It is time for someone to assemble specimens and write another.

TERMINOLOGY

Only a few technical terms are necessary in describing the rather featureless shells of the conchostracans. There are, however, a few words which I shall use which need explanations. The shell of most Conchostraca is not shed, but new increments are added from time to time. Since these new bands of shell are added above the previous edge, that is, anti-shingle-wise, the growth-lines are narrow depressions. These will be called growth-lines or concentric striations. Most of the fossils, and a few modern forms, have low, or even relatively high concentric ridges parallel to the growth-lines. If these are raised and linear, they will be called lirae. If broad and coarse, they will be called costae. Costellae are low, narrow, but rounded ridges. These terms are taken from modern usage in the brachiopods. Some of the fossils, but no recent conchostracans, have continuous, raised radial markings, which if fine, will be called radial lirae, if coarse, radial costae. Other members of the group, both fossil and recent, have radial markings between costellae, that is, in the intervales.

Because of the over-lapping of the increments of the shell, the internal casts show indented concentric striations which mark the anterior, not the posterior edge of each added band. Hence they are not actual growth lines, although they correspond in number to them. They may as well be known as pseudo-striae. The term intervale for the area between two concentric ridges is adapted from the usage of various French writers.

TAXONOMIC DESCRIPTIONS

Family CYZICIDAE Stebbing (emend. Barnard)

Bairdestheria gen. nov.

Caenestheriella Daday de Deés (*partim*), Math. és Termt. (see introduction for complete title), 1913, pp. 62–67, fig., pp. 570–574;– Ann. Sci. Naturelles, ser. 9, vol. 20, 1915, p. 106.

It is undoubtedly true that the nature of the spines on the telson is more important in classification than is the sculpture on the test, but

for paleontological purposes it seems necessary to subdivide Caenestheriella, leaving the strongly punctate forms in Daday's genus, and providing a new name for those species with radial markings between the lirae. In doing this we are merely reverting to Baird's[1] subdivision of "Estheria" into two groups:

"A. Valves of carapace dotted or punctate on the surface.

"B. Valves of carapace longitudinally striated on the surface." (It is obvious from his figures that by "longitudinally" he meant radially.)

Daday de Deés did not designate genotypes, and I have not seen the Hungarian edition of his paper. But one gathers from the Zoölogical Record, volume for 1914, that when Daday described the new genus Caenestheriella in 1913, he described only one species, *C. variabilis* sp. nov., hence this is the genotype. This is a strongly punctate form, belonging to Baird's group A.

It is Baird's group B which I now propose to segregate as a new genus, Bairdestheria, selecting as genotype, *Estheria donaciformis*, a living species found in Kordofan, southwest of Khartoum in Africa. Geological range, Jurassic to Recent.

Bairdestheria donaciformis (Baird)

Plate 1, figs. 1, 2.

Estheria donaciformis Baird, Proc. Zool. Soc., London, vol. 17, (for 1849), 1850, p. 89, pl. 11, figs. 5, 5a-c,—A. E. Grube, Ueber die Gattungen Estheria und Limnadia, etc., Berlin, 1865, p. 41, pl. 8, figs. 1–3, 7; pl. 9, figs. 2, 3, 7, 12–14; pl. 10, figs. 1–9, pl. 11, figs. 8, 13.

Caenestheriella donaciformis Daday de Deés, Ann. des Sci. Naturelles, Zoölogie, ser. 9, vol. 20, 1915, p. 179, fig. 38a-p.

"Valvulae choncharum umbone lata, a margine anteriore valde remota, fere in medio marginalis sita, marginens dorsalem valde superante; zonis incrementi 35–40, senioribus columnalite transverse granulatis, intervallisque angustis, pellucidis, transversalibus. . ."

The types were from Abeid, Korfodan, Africa. Daday de Deés says that Grube gave the best description of the species. Also that its distribution is limited to the zone of 30°–35° east longitude and 10°–15° north latitude.

So far as the shell is concerned, the diagnosis is:

Carapace oval, beak anterior in position, concentric lirae thin, raised, with radial striae in the spaces between them. The striae set

[1] Proc. Zoöl. Soc., London, vol. 17, (for 1849), 1850, pp. 84–90.

off irregular, discontinuous radial ribblets. Marginal setae generally present.

Other modern species are *Bairdestheria similis* (Baird), *B. packardi* var. *typica* (Spencer and Hall), *B. paradoxa* (Daday de Deés) *B. packardi* var. *cancellata* (Spencer and Hall), *B. ehrenbergii* (Daday de Deés),' *B. ehrenbergii* var. *dimorpha* (Daday de Deés), *B. ehrenbergii* var. *michaelsoni* (Daday de Deés), *B. indica* (Gurney), *B. annandalei* (Daday de Deés), *B. crinita* (Thiele), *B. elizabethae* (Sars), and *B. echinata* (Daday de Deés).

Bairdestheria transbaikalica (Chernyshev)

Estheria transbaikalica Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, no. 10, 1930, pp. 70, 77, pl. 1, figs. 15, 16.

This species shows radial striations but no reticulations. It occurs in Siberia with *B.? reticulata* at a lower horizon in the Upper Jurassic than *B. middendorfi* which seems to have some of the characteristics of both.

Bairdestheria daja (Chernyshev)

Estheria daja Chernyshev, Journal of Geology, Institute of Geological Sciences, Acad. of Sci., Ukranian S.S.R., Kiev, vol. 7, no. 3, 1940, pp. 24, 40, pl. 3, figs. 46, 47.

The carapace is almost circular, an unusual feature in this genus. There are from 14–15 low costellae, with very fine striae and lirae in the intervales. The specimens are from the Jurassic on the Daya River above Shevya village, Transbaikalia, Siberia.

Bairdestheria? dahurica (Chernyshev)

Estheria dahurica Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, no. 10, 1930, pp. 69, 77, pl. 1, figs. 11, 12.

Nothing in the description or figures gives any clue to the real characteristics of this species. The concentric lirae are numerous, 9 or 10 to the millimeter. It is said to be widely distributed in Transbaikalia and Mongolia, in strata supposed to be Upper Jurassic in age.

Bairdestheria? karpinskiana (Jones)

Estheria minuta (Alberti) var. *karpinskiana* Jones, Ann. Mag. Nat. Hist., ser. 5, vol. 12, 1883, p. 244, pl. 6, figs. 1a, b.

It is obvious that this form is not closely related to *"Estheria" minuta*. The concentric lirae are more numerous than in that species,

and the ornamentation on the intervales is definitely not reticulate. Jones described it as "in the form of minute, irregular vertical corrugations," which suggests Bairdestheria. It is from a formation of undetermined, but probably early Mesozoic age in the district of Troizk, on the eastern side of the Urals.

Bairdestheria sinkiangensis (Chi)

Estheria sinkiangensis Chi, Bull. Geol. Soc. China, vol. 10, 1931, p. 215, pl. 1, figs. 10a, 10b.

Age undetermined, but probably Upper Jurassic; China.

Bairdestheria kotahensis (Jones)

Estheria kotahensis Jones, Palaeontographical Soc. London, 1863, p. 81, pl. 2, figs. 24, 25. Jurassic?, India.

Bairdestheria murchisoniae (Jones)

Estheria murchisoniae Jones, Paleontographical Soc., London, 1863, p. 100, pl. 3, figs. 1–12.

Jurassic (Oxfordian), Scotland.

Bairdestheria? reticulata (Chernyshev)

Estheria reticulata Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, no. 10, 1930, pp. 70, 77, pl. 1, figs. 13, 13a, 14.

This name appears to cover two species, one with closely spaced, the other with distinctly separated lirae. The intervales are said to show meshes, more or less hexagonal in outline. This would indicate reference to Euestheria, were it not for the resemblance to *Bairdestheria middendorfii*, which combines the reticulate and irregular radial ornamentation. It is supposed to be Upper Jurassic in age, and is found in Siberia and Mongolia.

Bairdestheria middendorfii (Jones)

Estheria middendorfii Jones, Palaeont. Soc., London, 1863, p. 111, pl. 4, figs. 12–22;—Eichwald, Lethaea Rossica, vol. 2, pt. 2, 1865, p. 1181;—Reis, Explor. Geol. Chem. de long du Chemin de Fer de Sibérie, liv. 29, 1910, p. 40, pl. 2, figs. 24, 25, pl. 4, figs. 19, 20, 23;—Cockerell, Bull. Am. Mus. Nat. Hist., vol. 51, 1924, p. 132, pl. 2, fig. 2;—Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, pp. 67, 77, pl. 1, figs. 7–10;—Chi, Bull. Geol. Soc. China, vol. 10, 1931, p. 206, text fig. 1, pl. 1, figs, 1a, b.

Estheria orientalis Eichwald, Lethaea Rossica, vol. 2, pt. 2, 1865, p. 1183.

Jones published excellent drawings of this species, and Chernyshev's photographs corroborate them. A peculiar feature of the sculpture in the intervales is the combination of polygons and radial markings. Chi also noted this.

There has been considerable discussion about the age of the beds in Siberia and China which furnish the specimens. Jones supposed them to be Tertiary, but Chernyshev relegated them to the Upper Jurassic. Chi may be correct in his determination that they are Cretaceous.

BAIRDESTHERIA SUBQUADRATA (Sowerby, emend. Jones)

Cyclas subquadrata Sowerby, Fitton's Strata below the Chalk., Trans. Geol. Soc., ser. 2, vol. 4, pt. 2, 1836, pp. 177, 345, pl. 21, fig. 8.

Estheria elliptica Dunker, Programm. hoh. Gewerbschule, Cassel, 1943, p. 41;—Monog. Norddeutsch Wealdenbildung, 1846, p. 61, pl. 13, fig. 33;—Jones, Paleontographical Soc., London, 1863, p. 103, pl. 3, figs. 18–29, pl. 4, figs. 1–7.

Estheria subquadrata Jones, Geol. Mag. ser. 3, vol. 7, 1890, p. 389, pl. 12, figs. 1, 2a, b.

Sowerby gave no description of his species but published a figure of a young shell with a small but prominent smooth umbo and numerous concentric costellae. About 16 can be counted on the figure. The beak is almost central.

Dunker described *Estheria elliptica* in 1843, but did not figure it until 1846. His figure shows the same subcentral position of the beak as does that of Sowerby, but the costellae are much further apart, and only 6 are present. He gives the length as from 3.5 to 5 lines, and the height as about ¾ the length.

It is fortunate for us that Jones received specimens of this species from Dunker and was able to collect at Sowerby's type-locality. No one working from the literature alone would have suspected that the forms described by Jones were in any way related to those figured by the earlier authors. Why Jones used the German name *elliptica* is another puzzle. The figures in the Monograph of 1863 show that at least two species are involved in this complex, possibly more. One specimen from Germany (pl. 4, fig. 2) has the subcentral beak shown by both Sowerby and Dunker, but figs. 1 and 3 certainly represent two other species. The English specimens (pl. 3, figs. 18–29) are probably all one species. The anterior position of the beak is not what one would expect from Sowerby's figure of the type of *Cyclas subquadrata*. We can only take Jones' word for that identification.

The German specimens were found in a black shale of Lower Creta-

ceous age in Hanover. The English ones were from Sussex, where they occur at three horizons in the Wealden.

Bairdestheria kansuensis (Chi)

Estheria kansuensis Chi, Bull. Geol. Soc., China, vol. 10, 1931, p. 214, pl. 1, figs. 9a, 9b.

A peculiar sculpture, partly radial, partly polygonal, characterizes this species, which is from the Lower Cretaceous of China.

Bairdestheria nengkiangensis (Chi)

Estheria nengkiangensis Chi, Bull. Geol. Soc. China, vol. 10, 1931, p. 213, pl. 1, figs. 8a, 8b.

The large figure (8b) is obviously that of the cast of the interior of a left valve. It is interesting to note that the pseudo-striae are on the crests of the concentric undulations. This is the same sort of preservation as is common in Palaeolimnadiopsis, but it has no evolutionary significance. The sculpture on specimens with the shell preserved is of the type to be expected in members of this genus. Lower Cretaceous, China.

Bairdestheria intermedia (Chi)

Estheria elliptica var. *intermedia* Chi, Bull. Geol. Soc. China, vol. 10, 1931, p. 210, pl. 1, figs, 6a, 6b, 7, 11.

This species is referred to Bairdestheria chiefly because of the nature of the sculpture. It is a Lower Cretaceous form from China.

Bairdestheria sinensis (Chi)

Estheria middendorfii var. *sinensis* Chi, Bull. Geol. Soc. China, vol. 10, 1931, p. 209, pl. 1, figs. 2a, 2b, 3a, 3b, 4, 5.

This species is allied to *B. middendorfii*, but the carapace is smaller. The sculpture is of the same type. Lower Cretaceous, China.

Bairdestheria posidomyoides (Chernyshev)

Estheria posidomyoides Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, No. 10, 1930, pp. 65, 76, pl. 1, figs. 1, 1a, 2.

The concentric costellae are numerous, 7 to 8 in one millimeter. The age appears to be Upper Cretaceous, and the locality is on the Amur River in Siberia, a sufficiently vague location.

Bairdestheria amurensis (Chernyshev)

Estheria amurensis Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, No. 10, 1930, pp. 66, 76, pl. 1, figs. 3, 6.

Three species, belonging to three genera, appear to be included in this species. The specimens represented by figures 3 and 6 are Bairdestherias. The subcentral beak of the specimen shown in figure 4 indicates that it is an Orthothemos, whereas the recurved growth lines of the individual shown in figure 5 are those of a Limnadopsis. The two specimens which remain in Bairdestheria have relatively few costellae.

The horizon and locality are the same as for *B. posidomyoides.*

Bairdestheria mawsoni (Jones)

Estheria mawsoni Jones, Geol. Mag. dec. 4, vol. 4, 1897, p. 290, pl. 11, figs. 3a–g, 4–6.

This typical member of the genus is from strata of unknown age in cuttings along the Bahia and San Francisco railroad at various localities between 12 and 85.5 kilometers from Bahia in Brazil.

Family LIOESTHERIIDAE nov.

Carapace oblong, ovate, or rarely subquadrangular or semicircular, with numerous lirae, costellae, or costae, which cover practically the whole surface of the shell. Radial or reticulate markings are present more rarely.

It is with regret that the writer establishes this family, which will include most of the older fossil conchostracans. He is compelled to do so, for both Daday de Deés and Barnard point out that the Cyzicidae (Caenestheriidae) cannot be distinguished from the Leptestheriidae on shell characteristics alone, and it is therefore not possible to assign the fossils definitely to either. There does seem to be one way in which most of the fossils differ from modern Conchostraca. That is the presence of concentric elevated markings of various kinds. Continuous radial ribs are entirely unknown among the modern forms. It should be noted also that in contrast to modern forms, it is difficult to see the real growth lines. It should be definitely understood that this family does not include all of the fossils.

Lioestheria Depéret and Mazeran

Soc. d'Hist. Nat. d'Autun, Bull. **25**, 1912, p. 167.

"Les formes dont l'ornementation consiste en costules concentriques, fines et serrées souvent inégales et plus ou moins fasciculées, donant á l'ensemble de la carapace un aspect homogène, ou même presque lisse; la structure du test dans les intervalles des costules parait consister en poncutations fines devenant polygonales á un tres fort grossissement, ou en un quadrillé fin extrêmement serré."

Depéret and Mazeran did not designate a genotype, but since they said: "C'est á ce groupe qu'appartainent *Estheria lallyensis*, décrite dans ce memoire. . . .", it is obvious that it was this species on which their subgenus was founded. I therefore select it as the genotype.

The authors, in discussing the relationships of their new species, remarked that it belonged to a special group of Estherias, beginning with *E. striata* Munster of the Carboniferous, its variety *E. striata munsteriana* Jones from the Permian, and which continued in Lower Jurassic with *E. concentrica* Bean and ended with *E. elliptica* Dunker in the Wealden. There are reasons for doubting this genealogy.

Pruvost[1] cited this subgenus as: "Group de l'*E. striata* (*Lioestheria* Depér. et Mazer.)", but this can hardly be considered as the designation of a genotype. He added *E. sub-quadrata* Sowerby to the list given by Depéret and Mazeran.

The generic characteristics seem to be those expressed by the original describers and by Pruvost, that is, they are Lioestheriidae of oval form, anterior beak, and with numerous extremely close-set costellae, so flat that they give the shell an almost smooth appearance. The intervales between the costellae have puncta only.

Lioestheria lallyensis Depéret and Mazeran

Plate 1, fig. 3

Estheria lallyensis Depéret and Mazeran, Soc. d'Hist. Nat. d'Autun, Bull. **25**, 1912, p. 167, pl. 5, fig. 1.

This species has from 20 to 22 fine, irregular, more or less fasciculate concentric costellae. The specimens were from the Permian at Lally, near Autun, in northeastern France.

Lioestheria crassa (Lutkevich)

Estheria crassa Lutkevich, Bull. Com. Geol. Leningrad, vol. 48, 1929, pp. 721, 729, pl. 36, figs. 12, 12a, 13, 13a, 14, 14a.

The numerous concentric costellae, 15 to 25 in number, depending

[1] Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 51.

on the size, indicate that this is a Lioestheria. Although the specimens were, in part at least, derived from a boulder, the age is thought to be Mid-Devonian. The localities are in southern Esthonia.

Lioestheria striata (Goldfuss and Munster)

Sanguinolaria striata Goldfuss and Munster, Petref. Germaniae, pt. 2, 1840, p. 180, pl. 159, figs. 19a, b.

Cardiomorpha striata de Koninck, Anim. foss, terr. Carbon. Belgique, 1842, p. 105, pl. H., figs. 9a–c.

Estheria striata Jones, Paleontog. Soc., London, 1863, p. 23, pl. figs. 8–18.

Estheria (Lioestheria) striata Pruvost, Terr. Houiller du Nord et du Pas-de-Calais, 1919, p. 52, text-fig. 13, pl. 24, figs. 20–23,—Mem. 44, Musée Royal d'Hist. Naturelle de Belgique, 1930, p. 194, pl. 10, figs. 5, 6.

This species has been reported from Germany, Belgium, France, and Scotland. It appears to be most common in the upper part of the Dinantian (this is the age of the beds at the type-locality, Regnitzlosau, near Hof, Bavaria), but it occurs also in the Westphalian.

Lioestheria mathieui (Pruvost)

Estheria (Euestheria) mathieui Pruvost, Ann. Soc. Geol. du Nord, vol. 52, p. 171, text-fig. 1.—Chi, Bull. Geol. Soc. China, vol. 10, 1931, p. 217, text-fig. 2.

The carapace is nearly as high as long, with numerous concentric costellae. Westphalian, China.

Lioestheria raaschi spec. nov.

Plate 1, figs. 4, 5

Carapace small, oval, highly convex, with the beak near the anterior end. Costellae numerous, not greatly elevated, regularly arranged, with narrow intervales between them. At the umbonal region they are so slightly elevated that this area seems almost smooth. Under the higher powers of the microscope the shell is seen to be minutely punctate, and enough spinules are present on the costellae to give a vague radial appearance. Few specimens, however, retain the original test, and the casts show no surficial details. Specimens with the actual shell are iridescent, probably because of minute fractures.

Measurements: The holotype is 4.00 mm. long and 3.00 mm. high. Many smaller specimens are present in the collection, but none larger. Costellae about 40.

Comparisons: This is probably the species which Jones[1] identified as *Estheria minuta* (Alberti) from specimens which Prosser collected from the red beds of the Permian Cimarron series in Kansas. Beede[2] used the same name, but conservatively as *Estheria? minuta* Jones?, and Snider[3] more recently cited Jones' tentative identification of the species. But as Jones himself pointed out, all sorts of specimens have been identified as *Estheria minuta*. Any small "Estheria" from the Triassic is so identified, and apparently any red beds above the coal have been suspected of being Triassic.

Formation and locality: The holotype, M.C.Z. no. 4781, is from the Wellington formation, Lower Permian, at a locality in the SW ¼ of NW ¼, Sec. 2, T 21 N, R1W, Noble County, Oklahoma. The species occurs at many localities and at various horizons over an area of about 400 square miles in this general region. It is extraordinarily abundant. On one slab there are 113 specimens on 9 square inches, varying from 6 to 23 per square inch. If this is a fair sample, there would be 50,263,-155,400 individuals in a square mile and something over 20 trillion in the whole area. This is an estimate based on one layer at one locality, and is probably high, but if all the layers containing the species were taken into account, it is likely that an even larger figure would be reached. Why not use these shells for wampum, and pay off the national debt with *Lioestheria raaschi*?

Lioestheria inornata spec. nov.

Estheria ovata Jones (partim, nec Lea), Palaeontog. Soc., London, 1863, p. 84, pl. 2, figs. 28–31 (not figs. 26, 27, 32–38).

The extremely numerous thread-like, somewhat irregular costellae of this shell show that it is a Lioestheria, perhaps the youngest representative of the genus. According to Jones, the holotype (shown in his figure 28) is 8 mm. long and 6 mm. high, the greatest height being at about the middle of the valve. The intervales are smooth and punctate.

The specimens are from the Upper Triassic at Harding's pit, near Richmond, Virginia. The holotype is in the British Museum (Natural History).

Erisopsis gen. nov.

Lioestheriidae with sub-triangular carapace, the axis of the shell oblique, producing a pelecypod-like form. Genotype, *Erisopsis belli* sp. nov.

[1] Geol. Mag. dec. 4, vol. 5, 1898, p. 292, figs. 1–4. Fig. 3 is the only one which represents a Lioestheria.
[2] Kansas. Univ. Sci. Bull., vol. 4, 1907, p. 146.
[3] Oklahoma Geol. Sur., Bull. **11**, 1913, p. 108.

Shells of this sort closely resemble pelecypods and could easily be mistaken for them in cases where the chitinous material is not preserved. The type-species has rather widely spaced lirae, but *E. tessellata* (Jones) has the surficial markings of a Lioestheria.

Erisopsis belli spec. nov.

Plate 1, fig. 6

Carapace obliquely sub-oval, mytili-form, the greatest height back of the center. Beak near the anterior end, hinge straight. Surface with 16 narrow raised lirae, with broad interspaces.

The outline of this shell, with its axis directed from the beak to the ventral posterior end, strongly suggests reference to Palaeolimnadiopsis, but the lirae are not reflexed. Possibly it is an ancestor of the Palaeolimnadiopsis group.

Measurements: Length about 5.00 mm., height, 3.75 mm.

Horizon and locality: From the Cheverie formation, below the Windsor, on shore southwest of Cheverie on the Avon River, opposite Horton Bluff, Nova Scotia. Holotype in the Victoria Memorial Museum, Ottawa, Ontario. Collected and loaned by Dr. Walter A. Bell, for whom it is named.

Erisopsis tessellata (Jones)

Plate 1, figs. 7–9

Estheria tessellatus Jones, Trans. Geol. Soc. Glasgow, vol. 9, 1891, p. 80, pl. 5, figs. 2, 3, 4a, 4b.

This species has a short hinge (length 4.00 mm.) whereas the length of the carapace, measured along the diagonal axis, is 7.00 mm. The surface shows numerous closely-spaced lirae with minute quadrate pits in the spaces between them. The specimens were on the surface of a cannel coal, supposed to have come from the Upper Coal Measures of Ayrshire, Scotland.

Erisopsis adamsii (Jones)

Estheria adamsii Jones, Geol. Mag. vol. 7, 1870, p. 217, pl. 9, figs. 1a–c, ? 2.

The straight hinge, oblique axis, and the delicate reticulation of the valves make this an outstanding branchiopod. The length, more than an inch, is unusual. The resemblance to a pelecypod is so remarkable as to make one somewhat suspicious. The specimens were from the Coal Measures of Wales.

Asmussia Pacht

Asmussia Raimund Pacht, Der Devonische Kalk in Livland, 1849, p. 44. (A master's thesis, Dorpat. There is a copy in the Museum of Comparative Zoölogy.)

Posidonomya Pacht, Ueber Dimerocrinites oligoptilus, 1852, p. 26;—Der Devonische Kalk in Livland, 2d ed., 1859, p. 44, fig. 7.

Estheria Jones, Quart. Jour. Geol. Soc., London, vol. 12, 1856, p. 376.

Euestheria Depéret and Mazeran, Soc. Hist. Nat. d'Autun, Bull. **25**, 1912, p. 172.

Asmussia membranacea Pacht, the genotype of this monotypic genus, has a straight hinge-line, a subcentral beak, concentric costellae, and reticulately sculptured intervales, a combination not found in any other estheroid. Pacht himself gave up his new genus, under the impression that the shells were those of pelecypods, but Jones showed, from the structure of the shell, that they were really crustaceans.

The authors of Euestheria mentioned it as belonging to their subgenus of Estheria, because of the reticulate ornamentation, but the straightness of the hinge and position of the beak are such important characteristics that it seems best to revive the old name Asmussia.

Asmussia membranacea Pacht

Plate 2, fig. 1

Asmussia membranacea Pacht, Der Devonische Kalk in Livland, 1849, p. 44.

Posidonomya membranacea Pacht, Der Devonische Kalk in Livland, 2d ed., 1859, p. 44, fig. 7.

Estheria membranacea Jones, Palaeontographical Soc. London, for 1862, (1863) p. 18, pl. 1, figs. 6–7 (non figs. 1–5). (For a fuller bibliography see this paper.)

Estheria membranacea Lutkevich, Bull. Com. Geol., Leningrad, vol. 48, 1929, pp. 718, 728, pl. 36, figs. 1, 2a, b, 3, 4.

Specimens identified as this species have been reported from the original locality in Livonia, from northern Scotland, the Orkney and Shetland Islands, and from the northern Catskills of New York. All show the important generic characteristics, but there is considerable difference in the details. For example, the specimens from Livonia have about 13 concentric lirae, those from Scotland 18 to 20 costellae, and those from New York more than 30. Since all are of about the same size, this results in considerable difference in appearance.

Since there are other differences in the proportion of length to height, and in the position of the beak, it seems best to recognize three

species, particularly since Jones has already given a name, (*Estheria murchisoniana*) to the Scotch specimens.

It is an interesting but futile speculation to try to account for the changes which took place during the travels of members of this genus. Did it originate in Livonia, and add increments to its shell because of more favorable conditions in western Europe and North America? Or did the reverse happen? More favorable conditions in Livonia may have caused growth to be more rapid, so that adult size was reached in a short time, hence with fewer additions at the margin. One could argue either way with no satisfactory answer.

Asmussia progrebovi (Lutkevich)

Estheria progrebovi Lutkevich, Bull. Com. Geol., Leningrad, vol. 48, 1929, pp. 719, 728, pl. 36, figs. 5, 5a, 6, 6a, 7, 7a, 8.

Estheria sinuata Lutkevich, Bull. Com. Geol., Leningrad, vol. 48, 1929, pp. 720, 728, pl. 36, figs. 9, 9a, 10, 10a, 11.

This is undoubtedly an Asmussia, differing from *A. membranacea* Pacht in its greater length. According to Lutkevich its age is Middle Devonian. *Estheria sinuata* is evidently founded on a pathologic specimen of *A. progrebovi*, with which it is associated. The reentrant in the anterio-ventral margin must have been due to some accident.

The locality is on the Ruia River, near its junction with the Pliusa, southwest of Wesenberg in Esthonia.

Asmussia murchisoniana (Jones)

Plate 2, fig. 2

Estheria murchisoniana Jones, Quart. Jour. Geol. Soc., London, 1859, vol. 15, p. 404, figs. 14, c, d, p. 408;—Palaeontog. Soc., 1863, p. 14, pl. 1, figs. 1–5.

Estheria membranacea Jones, Geol. Mag., dec. 3, vol. 7, 1890, pl. 12, figs. 9a, b.

From the Upper Devonian of northern Scotland, the Hebrides, and the Shetlands.

Asmussia clarkei spec. nov.

Plate 2, figs. 3, 4

Estheria membranacea Clarke (nec Pacht), Rept. New York State Paleontologist for 1900, 1902, app. 3, p. 103, pl. 4, figs. 1–4. (In Univ. of State of New York., State Museum Rept., vol. 54, no. 1, 1902.)

Clarke gave no real description of his specimens but did provide excellent illustrations. The outline is much as in the Scotch and Li-

vonian specimens, that is, rounded-sub-quadrate, the chief specific characteristic being the presence of numerous crowded costellae, at least double the number present in European specimens. The largest specimen figured, 5.75 mm. long and 4.5 mm. high, (Clarke's fig. 2) has approximately 26 costellae, whereas a smaller one (fig. 1) has 29.

Asmussia membranacea in Livonia has thin lirae, not rounded costellae, and they are widely separated. Apparently the highest number present is 15.

A. clarkei is perhaps more closely allied to the Scottish form, since the latter has costellae rather than lirae, but 20 is the highest number reported from any of these specimens.

Horizon and locality: This species has so far been reported only from the basal beds of a green shale which overlies the Sherburne sandstone in Felter's Glen, 2.8 miles southeast of Rensselaerville, New York. According to Dr. G. A. Cooper, the age is Mid-Devonian.

Orthothemos gen. nov.

Lioestheriidae with straight hinge, sub-central beak, numerous costellae or lirae, the intervales punctate. Genotype, *Estheria draperi* Jones and Woodward.

This genus is suggested for species which in many respects resemble Asmussia, but lack reticulations, the intervales being merely punctate. The range appears to be from the Permian to the Cretaceous, but the identification as Permian of the South American beds in which it occurs is somewhat doubtful.

Orthothemos draperi (Jones and Woodward)

Plate 2, fig. 5; 6

Estheria draperi Jones and Woodward, Geol. Mag. dec. 4, vol. 1, 1894, p. 289, pl. 9, figs. 1, 1c.

Estheria stowiana Jones and Woodward, Geol. Mag. dec. 4, vol. 1, 1894, p. 290, pl. 9, figs. 2a, 2b.

Cyzicus (*Euestheria*) *draperi* Haughton, Ann. So. African Mus., vol. 12, 1924, p. 326.

These fossils with straight hinges might be included in Asmussia, but they have much more numerous concentric lirae and no trace of reticulation, the intervales being punctate. From Pseudestheria they differ not only in the straight hinge, but in the sub-central position of the beak. They are from the Cave sandstone, Upper Karroo (Triassic) at localities in Cape Colony, South Africa.

ORTHOTHEMOS REGULARIS (Reed)

Estheria regularis Reed, Bol. 34, Serv. Geol. e Min. do Brasil, 1929, p. 2, pl. 1, figs. 1–5.

This species is similar to the South African type of the genus, but the hinge is relatively shorter, the anterior and posterior ends decidedly rounded. The concentric lirae are also fewer in number. It is presumably from the Permian (or Triassic?) at a locality on the River Ignassu at Vallões, Brazil.

ORTHOTHEMOS MULTISTRIATUS (Reed)

Estheria regularis multistriata Reed, Bol. 34, Serv. Geol. e Min. do Brasil, 1929, pp. 4, 5, pl. 1, figs. 6, 7.

This form, described as a variety by Reed, has more numerous concentric lirae than *O. regularis*. Permian?, Brazil. Locality the same as the previous species.

ORTHOTHEMOS NEOTROPICUS (Reed)

Estheria neotropica Reed, Bol. 34, Serv. Geol. e Mineral do Brasil, 1929, pp. 4, 5, pl. 1, fig. 8.

So far as one can determine from the description and illustration, this species is much like *O. regularis*, but is said to have "closely placed regular equidistant delicate raised transverse lines" on the surface. Permian?, Brazil. Locality the same as the preceding.

ORTHOTHEMOS OVALIS spec. nov.

Estheria amurensis Chernyshev, (*partim*), Geol. and Prospecting Service, U.S.S.R., Bull. **49**, no. 10, 1930, pl. 1, fig. 4.

The beak is almost central and the costellae are numerous, probably about 20, so far as one can tell from the photograph. It is from the Upper Cretaceous on the Amur River in Siberia.

EUESTHERIA Depéret and Mazeran

Euestheria Depéret and Mazeran, Soc. d'Hist. Nat. d'Autun, Bull. 25, 1912, p. 169, pl. 5, figs. 2, 3, 4.

Lioestheriidae of oval form, anterior beak, distinctly separated costellae, with a pattern of minute polygons in the intervales. Genotype, (here selected) *Posidonia mintua* von Zieten. Depéret and Maze-

ran did not designate a genotype, but their discussion was based primarily on this species.

Most of the forms with this pattern in the furrows between the costellae seem to be Triassic in age. It is necessary to have well preserved specimens to see the polygons, and a source of error is present, for many internal casts show a similar pattern, due to the presence of small sand grains. The cement between them often presents a polygonal design. Many of the Devonian specimens belonging to various genera show this, as can be seen by consulting the figures in Jones' Monograph (1863).

Euestheria minuta (von Zieten)

Plate 2, figs. 7, 8

Posidonia minuta Alberti, (*Nomen nudum*), in De la Beche, Handbuch der Geologie, translated by H. von Dechen, Berlin, 1832, p. 453.

Posidonia minuta Goldfuss, Alberti, (*nomen nudum*), Jahrb. für Min., 1832, p. 227. Mentioned by Alberti, but species ascribed to Goldfuss.

Posidonia minuta von Zieten, Die Versteinerungen Württembergs, 1833, p, 453, pl. 54, fig. 5. Ascribed to Alberti. No description, but a specimen figured.

Posidonia minuta Alberti, Beit. zu einer Monographie des Bunten Sandst., Muschelk., und Keup., 1834, p. 120. Species ascribed to Goldfuss. A description given, with reference to von Zieten's figure.

Posidonia minuta Goldfuss, Petrefacta Germaniae, Zweiter Theil, 1840, p. 118, pl. 113, fig. 5. Gives a description and claims the species for himself.

Estheria minuta Jones. Paleontog. Soc., London, 1863, pp. 42–66, pl. 1. figs. 28–30, pl. 2, figs. 1–7, pl. 5, figs. 8, 9. Ascribes the species to Alberti and gives a full history and bibliography;—Geol. Mag., dec. 3, vol. 7, 1890, p. 387, pl. 12, figs. 6, 7, (not figs. 5 or 8.); Gross, Senckenbergiana, vol. 16, 1934, pl. on p. 311, fig. 7.

I have been unable to determine the exact standing of the name *Estheria minuta*. It has been ascribed to both Alberti and Goldfuss, but the legal author is probably von Zieten. The earliest mention I have been able to find is in the Jahrbuch für Mineralogie, 1832, p. 227, in which it is not described, but listed as *Posidonia minuta* Goldfuss in a brief article signed by F. A. von Alberti. It is mentioned again in von Dechen's translation of De la Beche's Manual of Geology (1832, p. 453) but not described. In Friedrich von Alberti's "Monographie des Bunten Sandsteins, Muschelkalks, und Keuper, 1834, p. 120, is the following description:

"*Posidonia minuta* Goldfuss: queroval mit 9–10 concentrishen Rip-

pen. Grösse einer Linsie, ähnlich der *Posidonia Becheri* Bronn's aus dre Grauwacke, und der *Posidonia Bronni* Goldfuss des Lias, aber kleiner und zierlicher." This, so far as I can find, is the first description, but unfortunately in the previous year, C. H. von Zieten, in his "Die Versteinerungen Württembergs", p. 72, pl. 54, fig. 5, had published a figure, ascribing the species to Alberti. Even though he gave no description, the issuing of the name with a recognizable figure would constitute legal publication. Hence the proper designation appears to be *Euestheria minuta* (von Zieten) rather than Goldfuss or Alberti.

This matter of names is brought up, not because it has any particular importance at the moment, but as an illustration of the exasperating problems which the present writer has constantly encountered in trying to describe a few Oklahoman fossils. The lioestherians from the American Permian which have been identified as *Estheria minuta* are like the original Triassic specimens in size only.

In spite of dubious taxonomic history of *E. minuta*, there has never been much doubt about the shells to which the early writers gave the name. The carapace is small, with from 8 to 12 low costellae, separated by furrows with about the same width. In these intervales are the polygons which are characteristic of the genus. The species is common in the Upper Triassic of Germany, France, and Great Britain.

Euestheria? stockmansi Maillieux

Estheria (*Euestheria*) *stockmansi* Maillieux, Mus. Royal d'Hist. Nat. Belgique, Bull. **15**, 1939, No. 10, p. 4, text-figs. 1 a, b, 2.

This species has a few prominent lirae and much resembles *Pseudestheria dawsoni* Jones. Maillieux says, however, that the intervales show a distinct reticulation, to be seen at a magnification of 50 diameters. It is from the Lower Devonian of the Ardennes of Belgium. An interesting feature is the presence of Spirorbis in the same beds.

The author shows no illustration of the reticulations, and one wonders whether they are real, or whether the appearance is due to the clastic grains in the shale in which they are imbedded. An allocation to Pseudestheria would seem more reasonable than one to the Triassic Euestheria.

Euestheria autunensis spec. nov.

Plate 2, fig. 11

Estheria minuta Depéret and Mazeran, (*nec* von Zieten), Soc. Hist. Nat. d'Autun, Bull. **25**, 1912, p. 169, pl. 5, figs. 2–4.

This species, according to its authors, is represented by numerous specimens, but the preservation is "mauvais, écrassés et laminés". They state that the number of costellae is "quinzaine," but they are more numerous on individuals from 3 to 5 mm. in length. Twenty to twenty-five can be counted on some of those illustrated by their photographs, a far greater number than those on the true *Euestheria minuta*. But in French *quinzaine* means "fifteen, more or less". There is even a question whether the species answers to their description of their subgenus Euestheria, for they state that only "Certains echantillons, mieux conservés que les autres, permettent de distinguer confusément, au microscope, une ornamentation réticulée, polygonale, dans l'intervalle des cordons". This is evidence that their genus was really founded on the Rhaetic *Estheria minuta*.

This species is found in the Middle and Upper Permian in the Autun coal basin of Northeastern France.

Euestheria exigua (Eichwald)

Posidomya minuta Kutorga, (*nec* Bronn), Verhand. Min. Gesell., St. Petersburg, 1844, p. 66, pl. 1, fig. 1–5.

Posidomya exigua Eichwald, Geogn. Russland, 1846, p. 455;—Lethaea Rossica, 1855, livr. 4, p. 231; Bull. Soc. Imp. Nat. Moscow, vol. 29, 1856, pt. 2, p. 559; Lethaea Rossica, 1859, livr. 6, p. 941, pl. 40, fig. 4.

Cyclas eos Eichwald, Geogn. Russland, 1846, p. 466.

Cytherina (*Cyclas*) *eos* Eichwald, Bull. Soc. Imp. Nat. Moscow, vol. 30, 1857, pt. 2, p. 307.

Posidomya eos Eichwald, Lethaea Rossica, 1859, livr. 6, p. 942, pl. 37, p. 13.

Estheria exigua Jones, Palaeontog. Soc., London, vol. for 1862, (1863), p. 37, pl. 1, figs. 22–24.

The above citations are from Jones. The present writer has no opinion on the identification of these fossils. The examples figured by Jones are euestherias. Whether or not they are the true *E. exigua* of Eichwald is left for Russian students to determine. Jones has pointed out the difficulties.

The original specimens were found in the Permian of Russia.

Euestheria mangaliensis (Jones)

Estheria mangaliensis Jones, Palaeontog. Soc., London, 1863, p. 48, pl. 2, figs. 16–23;—Geinitz (*partim*), Palaeontographica, suppl. vol. 3, Palaeont. Theil 2, Abth. 2, 1876, p. 3, pl. 1, figs. 4 and 7, 1, 2;—Middleton, Intellect. Observer. No. 21, 1862, p. 317;—Jones, Geol. Mag., dec. 2, vol. 5, 1878, p. 102;—Medlicott and Blanford, Manual Geol. India, 1879, p. 130, text fig.; 2d. ed., 1893, p. 170, text fig.; Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 261.

This species has about 15 regularly spaced lirae, with additional closely crowded ones near the ventral margin. The intervales appear to be punctate, but there is an obscure reticulation. It is not possible, without specimens, to say definitely whether it is a Pseudestheria or an Euestheria. It is found in the Triassic of central India, and according to Geinitz, in the Rhaetic of Argentina.

Euestheria laxitecta (Jones)

Estheria laxitecta Sandberger (nomen nudum), Verhandl. d. K. K. Geol. Reichsantalt, No. 16, 1871, p. 323;—Jones, Geol. Mag., dec. 2, vol. 5, 1878, p. 102.

Estheria minuta Alberti, =*E. laxitecta* Sandberger, Jones, Geol. Mag., dec. 3, vol. 7, 1890, p. 387, pl. 12, figs. 5, 8 a, b.

Jones considered this to be *Estheria minuta*, but since Sandberger did not describe or figure it, Jones becomes, although inadvertently, the author of the species. It differs from *E. minuta* in being larger and in having much more numerous lirae. The sculpture is typically euestherian. It is from the Lower Keuper at Windsheim, central Franconia.

Euestheria brodieana (Jones)

Estheria minuta var. *brodieana* Jones, Palaeontog. Soc., London, vol. for 1862, 1863, p. 66, pl. 2, figs. 8–15; Geol. Mag., dec. 2, vol. 5, 1878, p. 102.—Roemer, Zeitsch. d. geol. Ges., vol. 15, 1863, p. 702; Geologie von Oberschlesien, 1870, p. 176, pl. 15, figs. 10, 11.

This species differs from *E. minuta* in having smaller polygons in the intervales. It is found in the Upper Triassic (Rhaetic) of England, Scotland, and Germany.

Euestheria forbesii (Jones)

Estheria forbesii Jones, Palaeontog. Soc., London, 1863, p. 109, pl. 4, figs. 8–11; Geol. Mag. dec. 4, vol. 4, 1897, p. 263, pl. 11, figs. 1 a, b, 2.

E? *mendocina* Philippi, Tert. u. Quart. Verst. Chiles, 1887, p. 223, pl. 50, fig. 12.

E. mangaliensis (*partim*) Geinitz, Beitiäge zur Geol. u. Pal. des Argentinischen Republik, vol. 2, Palaeont. Theil, Abth. 2, 1876, p. 3, pl. 1, fig. 5.

This species has the typical form and reticulate ornamentation of Euestheria. It was collected in considerable numbers at Cacheuta,

south of Mendoza, Argentina. At the time Jones described it, the horizon was unknown, but the probabilities are that it is Triassic in age.

Pseudestheria gen. nov.

Lioestheriidae with oval carapace, engirdled by concentric lirae or costellae separated by spaces equal to or greater than their own width. No sculpture, except punctation, is present in the intervales. Genotype, *Pseudestheria brevis* sp. nov.

Since Estheria is a fly, it is not good practice to name a crustacean in such a way as to mislead entomologists. But in deference to paleontologists, who will regret, and perhaps protest, the passing of the name Estheria from our literature, I am venturing to use various combinations in which that word appears. The "false" portion of this one should be a warning to the dipterologists. I should have avoided such a practice were it not for the fact the "Estheria" looms large on the horizon of the paleontologist, whereas Estheria is just an unimportant fly, lacking even a nuisance value.

Pseudestheria and Euestheria are much alike, the difference being entirely in the sculpture. Since the polygonal pattern of the latter can be seen only on the best-preserved specimens, and even then only under the higher powers of the microscope, it is impossible in many cases to make definite identifications. Pseudestheria must inevitably become a sort of dumping ground for not-too-well preserved fossils. This is unfortunate, for it means that the genus has no stratigraphic significance. It may be possible, at some later date, to make a distinction between Pseudestheria *vera* and Pseudestheria *senso lato*. Used in its wider sense, the genus appears to range from the Lower Devonian to the end of the Triassic.

Pseudestheria brevis spec. nov.

Plate 2, figs. 9, 10

Carapace ovate, the beak near the anterior end. The height is to the length as about 7:10, and there are about 15 costellae, which are coarser and farther apart in the middle of the valve than in the ventral region. Casts of the interior are almost smooth, with widely spaced pseudostriae.

The holotype, M.C.Z. No. 4798, is 5.50 mm. long and 3.50 mm. high.

Formation and locality: SW ¼, NW ¼, Sec. 2, T 21N, R1W, Noble County, Oklahoma. Wellington formation, Lower Permian. A few specimens have been found in other localities in Noble County. Collected by F. M. Carpenter and G. O. Raasch.

A pathologic individual (M.C.Z. 4805) may ultimately prove to be of some interest, for it has two radial carinae.

Pseudestheria diensti (Gross)

Estheria diensti Gross (*partim*), Senckenbergiana, vol. 16, 1934, p. 309, pl. on p. 311, figs. 1, 3, 4, 5. (non figs. 2, 6), ? 8, 9.

As so commonly occurs with the description of "Estherias", this species presents annoying problems. Study of the figures seems to show that three species, belonging to two genera, were described by Gross. Fortunately he designated the specimen shown in his figure 5 as the holotype. The shell is oval, with 15 to 18 lirae or narrow costellae. The describer states that there is a reticulate structure in the intervales, but his figures 8 and 9 are not convincing and he does not state which shells show them. The specimens are from the Lower Devonian of the Eifel district in Germany.

Pseudestheria subcircularis spec. nov.

Estheria diensti Gross (*partim*), Senckenbergiana, vol. 16, 1934, pl. on p. 311, fig. 6 (not figs. 1–5, 8, 9).

This is the subcircular specimen which Gross compared with *Paracyclas rugosa* Goldfuss. There appear to be 20 or more narrow lirae, with wide intervales. The outline is distinctive, and the beak subcentral. It is from the Lower Devonian of the Eifel district in Germany.

Pseudestheria plicata (Lutkevich)

Estheria plicata Lutkevich, Bull. Com. Geol. Leningrad, vol. 48, 1929, pp. 722, 729, pl. 36, figs. 15, 15 a, 16 a–d.

The coarse costellae, relatively few in number for the size of the carapace, indicate that this is a Pseudestheria. The specimens are from the Mid-Devonian, on the Ruia River, near Rojki village, in Esthonia.

Pseudestheria dawsoni (Jones)

Estheria sp. Dawson, Acadian Geology, p. 256, fig. 58 d.
Estheria dawsoni Jones, Geol. Mag. dec. 1, vol. 7, 1870, p. 220, pl. 7, fig. 15; *ibid.*, dec. 3, vol. 1, 1884, p. 361, pl. 12, fig. 12.
Not *Estheria dawsoni* of Jones, 1878, or Pruvost, 1919, or Chernyshev, 1928. (For these, see under Palaeolimnadiopsis).

Like everything else connected with this investigation, *"Estheria" dawsoni* presents a problem. Jones gave no real description of the species, but figured a specimen 4.6 mm. long and 2.8 mm. high, with a smooth umbonal region 2.0 mm. long and 0.8 mm. high. This was a specimen sent by Sir William Dawson himself, so should be authentic, but Jones specifically states that it is not well preserved. It is listed, both in Jones' article, and in the "Acadian Geology" as having been found in the "Lower Carboniferous at Horton." One would naturally suppose that Horton Bluff was the locality, but Dr. Walter A. Bell, who is more familiar with this portion of Nova Scotia than any other geologist, tells me that he has never found this species in the Horton Bluff formation. He has been good enough to send me his material from the Cheverie formation below the Windsor. Some of the specimens were collected on the shore southwest of Cheverie, on the opposite side of the Avon river from Horton Bluff, and it is probable that this is Dawson's locality. At any rate, Bell's specimens are much more like that figured by Dawson than like the one Jones illustrated. It seems likely that the individual in Jones' hands was defective, for concentric lirae are present close to the beak in the material Bell collected, and there is no such extensive smooth umbonal region as is shown in Jones' figure. This is important, for a large smooth umbo is characteristic of the Limnadiidae, whereas the specimens in the present collection are definitely Lioestheriidae. Two obviously different species are present in Bell's collection. The ones which seem to be *P. dawsoni* may be described as follows:

Carapace elongate oval, with from 6 to 15 sharply elevated concentric lirae, separated by wide interspaces. The ratio of height to length is about 2:3. Only one of the five specimens is really well preserved. It is 3 mm. long and 2 mm. high, and has 8 lirae. A specimen 4 mm. long has 12, and a larger, but poorly preserved individual appears to have about 15.

PSEUDESTHERIA ALTA spec. nov.

Fig. 1. *Pseudestheria alta* Raymond. The holotype. x 6.

Carapace short, nearly as high as long. Beak anterior, almost at the front, hinge straight. The anterior outline is gently convex, the ventral one boldly rounded. There are about 14 narrow lirae, those at the beak obscured by pressure.

The holotype is 4.00 mm. long and 3.90 mm. high. It differs from all other members of the genus in being so nearly equidimensional.

The only known specimen was collected by Dr. Walter A. Bell from the Cheverie formation, Mississippian, at his locality 2217 on the shore of the Avon River opposite Horton Bluff, Nova Scotia. It is in the Museum of the Geological Survey of Canada.

PSEUDESTHERIA LEAIAFORMIS spec. nov.

Fig. 2. *Pseudestheria leaiaformis* Raymond. The holotype. The radial carinae are scarcely visible on the specimen. x 6.

Carapace small, subrectangular, the ventral outline only slightly convex. There is a median depression, as in Leaia, but no distinct carinae. The type has about 10 or 11 concentric lirae, whose course is almost straight on the median portion of the shell.

The most striking features of this shell are the median depression and the course of the lirae. The median depression alone might be due to an accident of compression, but the lirae have a leaiaform appearance.

The holotype is 4.25 mm. long and 2.75 mm. high. A larger specimen is 6. mm. long, 4. mm. high, and has 11 or 12 lirae.

Three specimens were collected by Dr. Walter A. Bell from the Cheverie formation, Mississippian, on the shore of the Avon River opposite Horton Bluffs, Nova Scotia, and are in the Victoria Memorial Museum at Ottawa.

Pseudestheria youngi (Jones)

Estheria youngi Jones. Trans. Geol. Soc. Glasgow, vol. 9, 1891, p. 80, pl. 5, figs. 1 a, b.

If the figure were to be trusted, this species should be referred to the genus Palaeolimnadia, for it seems to have a large smooth umbonal area. But Jones says "Below the umbo, which is bare, having been damaged", which puts the specimen in the same class with his example of *Pseudestheria dawsoni*. If a well preserved specimen were to be had, it would, as is the case with *P. dawsoni*, probably show growth-lines in the umbonal region. In fact, it seems to be closely allied to *P. dawsoni*, having 10 lirae below the damaged umbonal region.

The specimens were found in a shale in the upper part of the Lower Carboniferous limestone near Thornliebank, four miles southwest from Glasgow, Scotland.

Pseudestheria peachi (Jones)

Estheria peachi Jones, Geol. Mag., vol. 7, 1870, p. 220, pl. 9, fig. 17.

The specimens are poorly preserved, poorly described, and the figure is open to question. So nearly as one can judge, the species is related to *P. dawsoni* (Jones). It was found in the Lower Carboniferous shales at Salisbury Craigs, Edinburgh, Scotland.

Pseudestheria blackstonensis spec. nov.

Plate 3, fig. 1.

Carapace subcircular, but with the greatest length at an angle oblique to the hinge. Surface apparently without markings other than rather equally spaced, slender concentric lirae, of which there seem to be ten. Umbonal region smooth, either from lack of lirae or because of the state of preservation. Length 7.00 mm., height, 6.25 mm.

The holotype (M.C.Z. 4800) was collected by W. P. Haynes from Mid-Pennsylvania strata on the south bank of the Blackstone River at Central Falls, near Pawtucket, Rhode Island.

Pseudestheria elongata (Chernyshev)

Estheria (*Euestheria*) *elongata* Chernyshev, Annuaire de la Soc. Paleontologique de Russie, vol. 6, 1926, p. 65, pl. 7, fig. 6.

This species from the Westphalian of the Donetz coal basin is similar to *P. simoni* (Pruvost), but more elongate.

Pseudestheria cebennensis (Grand 'Eury)

Estheria cebennensis Grand 'Eury, Geol. et Paleont. du Terrain Houiller du Gard., 1890, pp. 338, 339, pl. 22, fig. 4.

Estheria (*Euestheria*) *cebennensis* Chernyshev, Annuaire de la Soc. Paleontologique de Russie, vol. 6, 1926, p. 70, pl. 7, figs. 7–9.

This is a large oval form, with the beak a little further back than in *P. elongata* (Chernyshev). It has been found both in France and the Donetz basin of Russia.

Pseudestheria simoni (Pruvost)

Estheria tenella Jones (*nec* Bronn), Paleontog. Soc., London, 1863, p. 31 et seq. (*partim*), pl. 2, fig. 39, pl. 5, figs. 1–5, 7; Bolton, Quart. Journ. Geol. Soc., London, 1911, vol. 67, pl. 28, figs. 1, 2; Barrois, Cat. foss. Mus. Houiller, Lille, 1919.

Estheria simoni Pruvost, Ann. Soc. Geol. du Nord, vol. 40, 1911, p. 64, pl. 1, figs. 4–8, text-fig. 2; Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 57, pl. 24, figs. 29–33, text fig. 15;—Chernyshev, Annuaire de la Soc. Paleontologique de Russie, vol. 6, 1926, pp. 67–82.

The most striking feature of this species is the subcircular form of some of the specimens. *P. simoni* differs from *P. brevis* in the same way that it does from *P. tenella*, that is, it is larger and has more lirae. It is found in the Westphalian of England, France, and Russia.

Pseudestheria limbata (Goldenberg)

Estheria limbata Goldenberg, Fauna Saraep. Foss, pt. 2, 1877, p. 43, pl. 2, figs. 12–14;—Pruvost, 13th International Geol. Cong., Belge, 1922, p. 649;—Guthörl, Abhandl. der Preuss. Geol. Landesanstalt, vol. 164, 1934, p. 13, text-fig. 4, pl. 1, figs. 5, 6, pl. 2, fig. 1;—Waterlot, Bassin Houiller de la Sarre et de la Lorraine, pt. 2, Faune Fossile, Lille, 1934, p. 42, text-fig. 5 A, pl. 6, figs. 13, 13 a, b.

This species is similar to *E. tenella*, with which it has been repeatedly confused, but has more numerous concentric costellae. It is from the Stephanian of Saarbrücken.

Pseudestheria rimosa (Goldenberg)

Estheria rimosa Goldenberg, Fauna Saraep. Foss., pt. 2, 1877, p. 44, pl. 2, figs. 16–18.

Estheria limbata Leppla, Geol. Skisse d. Saarb. Steinkohleng., 1904, p. 36, figs. 6–9;—Pruvost, 13th International Geol. Congress, Belge, 1922, p. 649;—Waterlot, Bassin Houiller de la Sarre et de la Lorraine, pt. 2, Fauna Fossile, Lille, 1934, p. 42, text-figs. 5, B. C. pl. 6, figs. 14, 15, 15 a.

Estheria rimosa Guthörl, Abhandl. der Preuss. Geol. Landesanstalt, vol. 164, 1934, p. 14, text-fig. 5, pl. 2, fig. 2.

Pruvost and Waterlot agree that *P. rimosa* is only a form of *P. limbata*, with which it is associated. Since the present writer does not use varietal names, he has listed the references separately.

Pseudestheria molesta spec. nov.

Estheria chilensis Jones (*nec* Philippi), Geol. Mag., dec. 4, vol. 4, 1897, p. 289, pl. 10, fig. 4 (non fig. 5).

"Valves subcircular, approaching subquadrate, . . . Umbo at the antero-dorsal corner, and at an angle of 40° to the extreme curvature of the concentric ringlets. Hinge-line straight behind the umbo, about half the length of the longest diameter of the valve. The other edges rounded; the anterior nearly semi-circular; the ventral obliquely curving up to meet the steeper and narrower posterior curve."

The specimen is from strata of unknown age, perhaps Carboniferous, from Arica, Peru.

Pseudestheria plicifera spec. nov.

Plate 2, fig. 12

Valves small, with numerous costellae, between which are narrow intervales. It differs from *P. brevis* in the more numerous concentric markings. The holotype is 5.00 mm. long and 3.75 mm. high. It has about 17 costellae.

Formation and locality: The holotype, M.C.Z. No. 4791, is from the Wellington formation, Lower Permian, at a locality in SE ¼, NE ¼, Sec. 34, T 22 N. R1W, Noble County, Oklahoma. It is a rather rare species but has been found by Carpenter and Raasch at other localities in the same region. Dr. Carpenter found three specimens in the famous insect-bearing beds of the Wellington at Elmo, Kansas.

Pseudestheria rugosa spec. nov.

Plate 3, fig. 2

Carapace short and high, with conspicuous costellae which are somewhat irregularly developed on the holotype. The length is 7.00 mm., the height 6.00 mm., and there are about 18 costellae. The single individual known is probably pathologic because of an injury during mid-life, but it has characteristics which show that it is not an abnormal individual of any of the associated species.

It differs from *Pseudestheria plicifera* in being higher in proportion to the length and in having coarser costellae, and from *P. brevis* in having coarser concentric markings.

The specimen, (M.C.Z. 4806) was collected by Drs. Carpenter and Raasch from the Wellington formation (Lower Permian) in the S W corner, Sec. 28, T 23 N. R1W, 10 miles north of Perry, Noble County, Oklahoma.

Pseudestheria tenella (Bronn)

Posidomya tenella Bronn, Neues Jahrb. für Min., 1850, pp. 577–579.

Estheria tenella Jones (*partim*), Palaeontog. Soc., London, 1863, p. 31 et seq., pl. 5, fig. 6, ? pl. 1, figs. 26, 27, (not pl. 2, fig. 39, pl. 5, figs. 1–5, 7).

Estheria tenella Goldenberg, Fauna Saraep. Foss., pt. 1, 1875, p. 23, pl. 1. fig. 25 b; *ibid.*, pt. 2, 1877, pp. 42, 52, pl. 2, figs. 9–11;—Pruvost, Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 58, footnote 2, p. 59.

Estheria tenella Guthörl, Abhandl. der Preuss. Geol. Landesanstalt, n. f., vol. 164, 1934, p. 12, text fig. 3, pl. 1, figs. 3, 4.

Guthörl was the first to point out the obvious fact that Bronn was the actual describer of this species. Jones had listed it under two authors, first under Jordan, and then under Jordan and Bronn. Goldenberg in 1875 (Guthörl takes the date at its face-value, 1873) merely says *Estheria tenella* sp., but in 1877 he credits it to Jordan although he makes the usual erroneous citation of Jordan and Bronn. Pruvost again cites Jordan as the author, although he was the first to point out that the Lancashire forms identified by Jones as this German species were wrongly named.

Pruvost straightened out the situation to a certain extent, and suggested that the specimen from the Permian at Salzback figured by Jones, be accepted as the topotype. He also thought that the specimens from Oschatz, Saxony, figured by Jones (pl. 1, figs. 26, 27), might really belong to *E. tenella*.

Guthörl, however, searched the Jordan collection in the Natural History Museum in Berlin, and selected the specimen shown in his pl. 1, fig. 3, as the lectotype. Since this is from the original locality and in the collection which Bronn studied, it is doubtless an authentic specimen. It is, unfortunately, considerably crushed, and Guthörl's text-figure is obviously inaccurate. His fig. 4, pl. 1, undoubtedly gives a better idea of the species. The age is Lower Permian.

Pseudestheria geinitzii (Jones and Woodward)

Estheria geinitzii Jones and Woodward, Geol. Mag., dec. 3, vol. 10, 1893, p. 531, pl. 19, fig. 4.

The small, short, high carapace with about 10 growth lines suggest comparison of this species with *P. brevis* Raymond. It is from the Permian near Münster on the Nabe, Germany.

Pseudestheria grebeana (Jones and Woodward)

Estheria geinitzii var. *grebeana* Jones and Woodward, Geol. Mag., dec. 3, vol. 10, 1893, p. 532, pl. 19, fig. 5.

The carapace is similar to that of *P. geinitzii*, with which it is associated. The authors suggest that the difference is sexual, since one shell is subquadrate, the other sub-triangular. Permian, near Münster on the Nabe, Germany.

Pseudestheria drummi (Guthörl)

Estheria drummi Guthörl, Oberrheinischer Geol. Verein, Jahrsberichte, n. f., vol. 20, 1931, p. 80, pl. 1, fig. 4, text fig. 1; Abhandl. der. Preuss. Geol. Landsanstalt, vol. 164, 1934, p. 15, pl. 2, fig. 3, text fig. 6.

The description and figures of this species are so poor that it is practically unrecognizable. The text-figure suggests reference to the genus Orthothemos, but the photograph precludes such an assignment. The specimens are from the Lower Permian of the Lebach-Saar district in western Germany.

Pseudestheria obenaueri (Guthörl)

Estheria obenaueri Guthörl, Oberrheinischer Geol. Verein., Jahrsberichte, n. f., vol. 20, 1931, p. 82, pl. 1, fig. 5, text-fig. 2; Abhandl. der Preus. Geol. Landesanstalt, vol. 164, p. 16, pl. 2, fig. 4, text-fig. 7.

This was described as the largest known "Estheria" (length 16. mm., height 10. mm.). As in the case of *P. drummi*, the photographs seem to show that the species fits in the genus Pseudestheria.

The specimens were collected from the Lower Permian at Lebach-Saar, a famous coal basin in western Germany.

Pseudestheria lata (Mitchell)

Estheria lata Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 110, pl. 3, figs. 8, 9.

A large form, length 7 mm., height 7 mm., from the Upper Permian at Merewether Beach near Newcastle, New South Wales.

Pseudestheria belmontensis (Mitchell)

Estheria belmontensis Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 110, pl. 4, fig. 5.

This is a form in which the costellae die out on approaching the hinge in the region behind the beak, thus producing a narrow flattened area which Mitchell likened to a hinge plate. It is from the Upper Permian near Belmont, Northumberland Co., New South Wales.

Pseudestheria novacastrensis (Mitchell)

Estheria novacastrensis Mitchell, Trans. Linn. Soc. of New South Wales, vol. 52, 1927, p. 109, pl. 3, figs. 5, 6.

This seems to be a typical member of the genus, although of large size, the highest figures given by Mitchell being: length 9 mm., height, 6 mm. It is from the Upper Permian (Newcastle Coal Measures), at Merewether Beach, near Newcastle, New South Wales.

Pseudestheria trigonellaris (Mitchell)

Estheria trigonellaris Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, 109, pl. 4, fig. 6.

The features are typical of the genus, and since the specimen is a mold of the exterior, it is fairly certain that no reticulate sculpture is present.

From the Upper Permian at Merewether Beach, near Newcastle, New South Wales.

Pseudestheria? obliqua (Mitchell)

Estheria obliqua Mitchell, Trans. Linn. Soc. of New South Wales, vol. 52, 1927, p. 109, pl. 4, fig. 1.

This is a single poor specimen from the Upper Permian at Merewether Beach near Newcastle, New South Wales.

Pseudestheria frikiensis (Grabau)

Estheria frikiensis Grabau, Stratigraphy of China, vol. 1, 1924, p. 486. (Upper Permian, China.)

Pseudestheria multicostata (Emmons)

Posidonia multicostata Emmons, Geol. Rept., North Carolina, 1856, p. 323, fig. W 1, 2; American Geology, pt. 6, 1857, p. 134, fig. 103; Manual of Geology, 2nd ed. 1860, p. 191, fig. 166, 4.

Estheria ovata Jones (*partim*, *nec* Lea), Palaeontog. Soc., London, 1863, p. 86, text-fig. 6.

Since the type of this species is not now available, it may be that I have not correctly identified it. I have seen no specimens from the original locality in North Carolina, but one which J. B. Woodworth collected at Midlothian, Virginia, appears to have the characteristics shown in Emmons' figure. The species differs from *P. ovata* Lea in having a straighter hinge, lirae instead of costellae, and a greater length in proportion to the height. If this identification is correct, the species occurs in the Upper Triassic of both North Carolina and Virginia.

Pseudestheria emmonsi spec. nov.

Estheria ovata Jones (*partim*, *nec* Lea), Palaeontog. Soc., London, 1863, p. 84, pl. 2, figs. 26, 27, non figs. 28–38.

As Jones points out in his article in the Geological Magazine, dec. 3, vol. 7, 1890, p. 386, this form from Prince Edward, near Richmond, Virginia, differs from the other Triassic varieties in North America in having the lirae widely separated. The intervales are smooth, and in this respect are similar to what seem to be typical specimens of *Estheria ovata* Lea from Pennsylvania. The number of concentric lirae is, however, much less.

Holotype: the specimen shown in Jones' figure 27, in the British Museum (Natural History).

Pseudestheria ovata (Lea)

Posidonia ovata Lea, Proc. Acad. Nat. Sci., Philadelphia, vol. 8, 1856, p. 77.
Possibly *Estheria* ovata Jones (*partim*), Paleontog. Soc., London, 1863, p. 8, 4, 84, pl. 2, figs. 28–37.

Lea's material was collected at a tunnel near Phoenixville in Eastern Pennsylvania, and, so far as I can learn has never been figured. The Museum of Comparative Zoölogy has material from this locality, probably collected by W. B. Rogers.

Lea did not properly describe his species, merely saying that it was seven-twentieths of an inch in transverse diameter, and that it had numerous minute concentric costellae. He also mentioned that it differed from the specimens Sir Charles Lyell[1] had figured, but not named, from Richmond, Virginia. Jones had in his hands a large collection from Phoenixville but unfortunately did not figure any of them. He noticed that there were three forms present, one broadly ovate, one more narrow, and one smaller type with thickly crowded ridges. From a study of our specimens I am inclined to think that the last is the real *E. ovata*. In many cases the shell is preserved and appears to be punctate. I can find no specimens with a definitely reticulate structure. It appears to be a Pseudestheria.

Pseudestheri hindei (Jones)

Estheria ovata Jones (*partim*), Palaeontog. Soc., London, 1863, p. 98.
Estheria hindei Jones, Geol. Mag., dec. 3, vol. 8, 1891, p. 51, pl. 2, figs. 5–8.

There are about 15 concentric costellae on a specimen 7 mm. long and 4.5 mm. high. The intervales are bare of ornament. It differs from *Pseudestheria ovata* (Lea) which occurs at the same locality in being proportionally longer. From the upper Triassic at Phoenixville, Penna.

Pseudestheria lewisii (Jones)

Estheria lewisii Jones, Geol. Mag., dec. 3, vol. 7, 1890, p. 385, pl. 12, figs. 3, 3 a.

There are 19 or 20 concentric lirae, relatively far apart on the dorsal region, closer together below. This feature, and the great length seem to characterize the species. The intervales show an irregular pattern which Jones ascribed to sand grains.

The specimens were from the Triassic sandstone of Bucks County, Pennsylvania.

[1] Quart. Jour. Geol. Soc. London, 1847, vol. 3, p. 274, fig. 6.

Pseudestheria? pennsylvanica (Wanner)

Estheria mangaliensis pennsylvanicus Wanner, Penn. Acad. Nat. Sci., vol. 78, 1926, p. 25, fig. 2.

Until specimens can be studied, it is futile to speculate about this form. It was poorly described and figured, and it seems possible that two species are involved, since the "number of ridges of growth" is said to be from 8 to 17. My feeling, from what I have seen of specimens, is that the number of conspicuous concentric ridges is not highly variable: the finer concentric markings on the margins may be ignored, for they are numerous in almost all species. This species, or variety, was described from specimens collected from the Upper Triassic of York County, Penna.

Pseudestheria ipsviciensis (Mitchell)

Estheria mangaliensis Etheridge (*nec* Jones), in Jack and Etheridge, Geol. and Pal. of Queensland and New Guinea, 1892, p. 387.

Estheria ipsviciensis Mitchell, Trans. Linn. Soc. of New South Wales, vol. 52, 1927, p. 107, pl. 3, figs. 1–4.

Ethridge's comparison of this form to *Estheria mangaliensis* would suggest reference to the genus Euestheria. Etheridge says "reticulation not preserved". Mitchell makes no comment on this subject but points out various ways in which the Indian and Australian species differ. The species is from the Upper Triassic at Denmark Hill, Ipswich, Queensland, Australia.

Pseudestheria heckeri (Chernyshev)

Estheria heckeri Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, No. 10, 1930, pp. 73, 78, pl. 1, figs. 18–20.

Although the outline of the carapace is subcircular, the beak is anterior, and the intervales are punctate. There are from 5 to 7 concentric lirae per millimeter. The specimens came from Kubekova village on the Enissei River, Siberia, and the age is supposed to be Lower Jurassic or Upper Triassic (Rhaetic).

Pseudestheria ? faveolata (Chernyshev)

Estheria faveolata Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, 1930, pp. 73, 78, pl. 1, fig. 17.

The generic reference is purely a guess. The description and figure provide no basis for anything more. The presence of "15 to 18 growth

ridges in 1 mm." suggests Lioestheria, but the species seems to be out of the usual vertical range of that genus. The specimens are from Khakharei, in Irkutsk, Siberia, and were derived from strata of Lower Jurassic or Upper Triassic (Rhaetic) age.

Psuedestheria ? kryshtofovichi (Chernyshev)

Estheria kryshtofovichi Chernyshev, Geol. and Prospecting Service, U.S.S.R., Bull. **49**, No. 10, 1930, pp. 75, 78, pl. 1, fig. 21.

This species is compared by its author with *Estheria faveolata*, but both are so poorly described and figured that one cannot be at all sure of the generic reference. The specimens are from Andreev's Bay, Ussuri Gulf, Siberia, and were found in strata whose age is not definitely determined ("approximates in age the Khakharei and Kubekova series").

Palaeestheria Barnard (emend)

Palaeestheria Daday de Deés, Ann. Sci. Nat. Zoology, ser. 9, vol. 20, 1915, p. 51. *Nomen nudum.* (No species mentioned.)

Palaeestheria Rennie, So. African Journ. Sci., Johannesburg, vol. 31, 1934, p. 233. *Nomen nudum.* (A poor specimen figured, but not named.)

Palaeestheria Barnard, Ann. So. African Mus., vol. 28, 1929, p. 254.

This genus has never been defined. Daday de Deés remarked that since Estheria must disappear from palaeozoölogy, he recommended the name Palaeestheria for all the fossils, and suggested the family name Palaeestheriidae. He named no particular species, and proposed no genotype. It was at that time an absolute *nomen nudum.*

Rennie described and figured a badly preserved specimen from the Witteberg series, (Devono-Carboniferous) at Port Alfred, Cape Colony, as Palaeestheria sp. The photographic illustration is as poor as the specimen, and Rennie was entirely right in not giving it a specific name, although he did give as good a description as was possible.

Barnard used the name in the same wide sense as Daday de Deés, and gave no diagnosis. He did, however, list three species under the generic name, which according to the rules would appear to make the genus valid. It therefore dates from Barnard and not from Daday de Deés.

I herewith select the first species listed by Barnard, *Estheria anomala* Jones, as the genotype and offer the following brief diagnosis, based on that species.

Carapace ovate, umbonal region smooth, the remainder bearing

numerous narrow, sharp costellae, between which there is no ornament.

This genus is in many respects similar to Pseudestheria, but differs in having more numerous and more close-set costellae, and particularly in having a larger smooth area at the umbo.

Palaeestheria anomala (Jones)

Plate 3, fig. 3

Estheria anomala Jones, Geol. Mag., dec. 4, vol. 8, 1901, p. 352, text-figs. 1–4.
Palaeestheria anomala Barnard, Ann. So. African Mus., vol. 28, 1929, p. 255.

"This left valve has the oblong-ovate shape common to the genus [Estheria] and bears evidence of numerous concentric close-set lines or ridges. It measures 5 mm. in length and 3 mm. in height."

Another specimen (Figs. 3, 4). "The spaces between the concentric ridges exhibit no ornament."

This description is brief, and so far as it goes, would not distinguish the genus from Pseudestheria. Inspection of the figures, however, shows that the umbo is relatively large and smooth.

The specimens are from shales associated with the Lower Cretaceous Enon conglomerate of the Uitenhage beds near Heidelberg, South Africa, a formation originally supposed to be Jurassic.

Palaeestheria ? andrewsii (Jones)

Estheria andrewsii Jones, Geol. Mag., dec. 3, vol. 8, 1891, p. 50, pl. 2, figs. 1–4.

This may be a Bairdestheria, but the large size of smooth umbonal shell suggest relationship to the Limnadiidae. Jones compares it with *E. subquadrata* and *E. elliptica*. The surface bears a delicate punctate sculpture which, on the casts of the interior, produces a "delicate linear granulation."

The specimens were found in the Wealdon (Perbeck) in Wiltshire, England.

Estheriella Weiss

Plate 3, figs. 4, 5

Estheriella Weiss, Zeit. Deutsch. Geol. Gesellschaft, vol. 27, 1875, p. 712 (first mentioned in footnote on p. 711);—Jones, Geol. Mag., n.s. dec. 3, vol. 8, 1891, p. 53, pl. 2;—Pruvost, Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 61.

This is one of the few generic names in common use, and the biblio-

graphy could be considerably extended. The above are, however, the really important papers.

Weiss based his subgenus of "Estheria" on the presence of radial ribs, which are largest and sharpest on the mid-ventral part of the carapace and become faint on the umbo and anterior and posterior ends. He ascribed two species, *Posidomya nodoso-costata* Giebel[1] and *P. wengensis* Giebel[2] (nec Wissmann[3]) to the new subgenus. Since the specific name *wengensis* was preoccupied in the genus Posidomya when Giebel used it, his species not being the same as that described by Wissmann, Jones in the article cited above has replaced it by *costata*, a term employed by Weiss in the footnote to his paper of 1875. Weiss gave no description, but stated that it was a name which he had expected to use until he became rather sure that his specimens really belonged to *Posidomya wengensis* Giebel.

Giebel's figures were poor, but Jones borrowed specimens from the type-locality, and published excellent figures of both species. Pruvost, in the memoir cited above, p. 61, casts doubt on the identification of the specimens figured by Jones as *Estheriella nodosocostata*, using for them the name *Estheriella lineata* Weiss. Weiss himself pointed out that Giebel's specimens had only 7 radial ribs, whereas the ones he studied had a maximum of 12. However, he stated that only those in the mid portion of the shell were prominent, and it may be that Giebel noticed these only. Since Jones', Weiss', and Giebel's specimens are from the same locality and since they agree in most features, it is probable that they belong to the same species. In any event, I propose to designate *Posidomya nodosocostata* Giebel the genotype of Estheriella.

In that case, the generic characteristics are the oval carapace with rather coarse radiating costae, separated by interspaces several times their own width. The radial costae die out as they approach the beak and the anterior and posterior ends. They are crossed by numerous rather widely spaced costellae, which produce nodes where they cross the radial costae.

The true *Posidomya wengensis* Wissmann has numerous radial costellae, so fine that they can be seen only under the microscope. It does not belong to this genus.

The largest specimen of *E. nodosocostata* has a length of 4.3 mm.,

[1] Zeitschrift für die gesamnten Naturwissenschaft, Halle, 1857, p. 309, pl. 2, fig. 7.

[2] *Ibid.*, p. 308, pl. 2, fig. 6.

[3] Beitrage zu Petrefacten-Kunde, Ausgeben von Graf von Munster, vol. 4, 1841, p. 23, pl. 16, fig. 12.

height 2.8 mm. The largest *E. costata* is 3.8 mm. long and 2.5 mm. high. The types are from the Bunter sandstone, Triassic, at Durrenberg, Sachsen, Germany.

Estheriella lualabensis Lariche

Plate 3, fig. 6

Estheriella lualabensis Lariche, Revue Zoologie Africaine, vol. 3, fasc. 1, 1913, p. 3, pl. 1, figs. 1–14, pl. 2, fig. 1. Brussels.

If Estheriella be restricted to those species which have the generic characteristics of *E. nodosocostata*, it is a small genus, and entirely confined to the Triassic.

It reaches its culmination in *E. lualabensis*, the most highly ornamented of all conchostracans. In the middle of the carapace there are five prominent radial costae, and strong nodes are formed where they are crossed by the concentric ribs. Less conspicuous radial markings are present on some specimens, so that the total number may be as many as 11. The radial markings die out on the umbo and near the ventral margin.

This species is common in the Triassic along the railroad between Stanleyville and Ponthierville, Belgian Congo, Africa.

Pruvost on Estheriella

Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 61.

Pruvost placed all conchostracans with radial markings in the genus Estheriella, but subdivided them into three groups.

1. Group of *Estheriella reumauxi* Pruvost. The members of this group have discontinuous radial markings, and what is more important, a sinuous posterior outline. The growth lines are reflexed at the dorsal border. This indicates that these species are allied to the modern Limnadopsis, and that they belong to the Limnadiidae, whereas the members of the second and third groups probably belong to other families. A new generic name will be proposed for this group on a later page.

Pruvost placed in this group *Estheriella trapezoidalis* Krotow, *E. oblonga* Krotow, and *E. costata* Weiss, but none of these species shows the generic characteristics of the type of *E. reumauxi*. They will be mentioned below.

2. Group of *Estheriella nodosocostata* Weiss (sic). This is the true Estheriella as restricted, and has already been discussed.

3. Group of *Estheriella multiradiata* (sic) Jones. Pruvost proposed to gather in this group species which were rounded-oval with concentric undulations rather than costae. These are crossed by numerous radial lirae. The umbo is subcentral in some; in others near the anterior end.

Jones described the species to which Pruvost refers as *Esheriella radiata* var. *multilineata*. Pruvost's citation is probably a *lapsus calami*. For this group I suggest the generic name Dadaydedeesia, in memory of that most proficient student of modern Conchostraca. The several other genera which have been named for him have used all the shorter variants.

Dadaydedeesia gen. nov.

Lioestheriidae with the carapace oval, subquadrate, or trapezoidal, but with rounded anterior ventral and posterior outlines. Surface with concentric undulations, costellae, or lirae, crossed by radiating lirae which may be continuous over the whole shell or present on certain portions only. Beak sub-central to sub-anterior in position. Genotype, *Estheriella multilineata* Jones.

This genus is probably artificial, and could easily be split into several genera, but the time does not seem ripe for doing so. The previous position of students of this type of conchostracan has been that all species with radial markings were closely related. Now that further study has shown that two families are involved, it becomes fairly certain that radial markings were developed in various lineages. Dadaydedeesia is therefore likely to be broken up later, when more is known about the fossils.

Dadaydedeesia multilineata (Jones)

Plate 3, figs. 9, 10

Estheriella radiata (Salinas) var. *multilineata* Jones, Geol. Mag., dec. 5, vol. 2, 1905, p. 50, pl. 2, figs. 1–4.

"The valves are broadly subovate, nearly semicircular, short, and broad or oval-oblong with rounded ends. The anterior extremity has the bolder curvature. The dorsal border is nearly straight; ventral border boldly curved. The umbo is toward the anterior end of the dorsal border, at one-third the length of the valve. . . . The main concentrics or wrinkles are about fifteen in number . . . having numerous small, subsidiary, parallel raised lines intercalated on their surfaces and in their interspaces, . . . crossed with a radial ornament.

"The Malayan specimens are characterized by having twenty-four and more delicate, close-set, parallel linear furrows radiating from the umbo to the ventral edge of the valve."

The specimens are from the Triassic at Pukus Semanggol, Larut, Perak, Malay Peninsula.

Another species which seems to be related and referable to this genus is *Estheria tegulata* Jones [1] from the Coal Measures of Scotland.

Estheria radiata Salinas[2] from the Triassic of Sicily, is, according to Jones, even more closely related. Pruvost also included *Estheriella lualabensis* in this group, but as shown above, it seems to be a real Estheriella. I should include here three species which Pruvost assigned to his group of *Estheriella reumauxi*. These are *Estheriella trapezoidalis* Kratow,[3] from the Permocarboniferous of Russia, *Estheriella oblonga* Kratow[4] from the same locality, and *Estheriella costata* Weiss[5] from the Triassic of Dürrenberg, Saxony. All of these species differ from *E. reumauxi* in lacking the backward curve of the growth-lines at the hinge.

Dadaydedeesia ? aricensis (Jones)

Estheria aricensis Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 264, pl. 10, figs. 1–3.

The state of preservation of the specimens, as described by Jones, makes it impossible to assign this species definitely to the genus under which it is here listed, but one individual shows interrupted radial lines. The specimens are rather large, ranging from 9.4 mm. to 17.0 mm. in length. They are from beds of unknown age, possibly Carboniferous, at Arica, Peru.

Monoleiolophus gen. nov.

Lioestheriidae with oval carapace, relatively widely spaced concentric lirae, and a single costa, extending from the beak to the posterior ventral margin. Genotype, *Monoleiolophus unicostatus* sp. nov.

This genus may be allied to Estheriella, or it may be that the single radial rib has no significance which can be interpreted at the present time. Since the genotype was found in a shale containing numerous

[1] Trans. Geol. Soc. Glasgow, vol. 9, (1891), p. 82, pl. 5, figs. 5, 6a, 6b.

[2] Sulle Esterie del Trias di Sicilia, small 8 vo. Palermo, Museo. Geol. Min. R. Univ. Palermo 1897, pp. 1–12, pl. 1 (I have not been able to find a copy of this book).

[3] Mem. du Comité Geologique, St. Petersburg, vol. 6, 1888, pp. 469 and 557, pl. 2, fig. 27.

[4] *Ibid.*, pp. 470 and 557, pl. 2, fig. 28.

[5] Zeitsch. Deutch. geol. Gesellsch., vol. 26, 1875, p. 711. Jones, Geol. Mag., dec. 3, vol. 8, 1891, p. 53, pl. 2, figs. 9, 10a, b.

specimens of Leaia, the first suggestion which came to the writer was that it was an abnormal individual of a species of that genus. But the rib is definitely rounded, not carinate, and the outline is distinctly that of a lioestherian. It may be related to the Mississippian *Leaia avonensis*, a species which strongly suggests the beginnings of the Leaiadidae. The carapaces of the Conchostraca have so few striking characteristics that their relationships will probably always be subject to individual interpretation.

Monoleiolophus unicostatus spec. nov.

Plate 3, fig. 11

Carapace oval, height slightly less than two-thirds the length. A low round-crested ridge extends from the umbo to the posterior ventral margin. It dies out at both ends, reaching neither the beak nor the margin. There are about 13 to 16 concentric ridges. A few near the beak are lirae, those near the middle are fine costellae, and the two nearest the margin are lirae. Where the concentric ridges cross the radial one there are slight depressions, producing a series of nodes in the intervals.

The holotype is 6.50 mm. long and 4.00 high.

Formation and locality: Three specimens were found by the writer in a shale above the Lower Mahoning sandstone of the Conemaugh series on the abandoned street railway grade in the western outskirts of Conemaugh, Penna. The holotype is No. 4792 M.C.Z

Family LYNCEIDAE Stebbing

Conchostraca with a carapace which lacks growth-lines.

Lynceus Müller

Not definable on the basis of the carapace alone, except as above.

Lynceus stchukini Chernyshev

Lynceus (*Limnetis*) *stchukini* Chernyshev, Journal of Geology, Institute of Geological Sciences, Acad. of Sci., Ukranian S.S.R., Kiev, vol. 7, 1940, pp. 25, 41, pl. 3, figs. 48–51.

This is probably the only known fossil belonging to this family. The surface lacks growth-lines, a family characteristic. The form is elongate ovate, the anterior end nearly twice as high as the posterior.

An interesting feature is the preservation of fragments of the antennae and a portion of a pair of posterior appendages, not definitely identified. Another unusual condition is the presence of a small patch (1 mm. in diameter) showing rounded impressions, 0.14 mm. in diameter, which Chernyshev considered to be the eggs, since they occupy the position of the ovarium in modern Lynceus.

The specimens are from the Jurassic on the right bank of the Daya River above Shevya village, Transbaikalia, Siberia.

Family LIMNADIIDAE Sars

Carapace ovate with relatively few lines of growth, sculpture absent from the intervales, and, in most genera, there is a relatively large smooth umbonal region.

It is difficult to characterize this family on the basis of the nature of the carapace, for Limnadopsis, a modern genus, is so different in shape from the other genera that exceptions have to be made. A new genus, closely allied, forms another obstacle. If the shell alone were known, it would be easy, and convenient, to split the family, but that can hardly be done so long as it is agreed that the nature of the rostrum and the telson is more important than the characteristics of the carapace.

Palaeolimnadia gen. nov.

Limnadiidae with relatively long oval carapace, large smooth umbonal region, and few growth lines. Genotype, *Estheria wianamattensis* Mitchell.

The anterior and posterior margins of the modern Limnadia make a distinct angle with the apex at the beak, whereas the carapace of Palaeolimnadia is regularly oval. The latter genus also lacks the external expression of the muscle-scar, so prominent a feature of most of the modern forms.

Palaeolimnadia wianamattensis (Mitchell)

Plate 3, figs. 7, 8

Estheria wianamattensis Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 108, pl. 2, figs. 7, 8.

The carapace resembles that of *P. coghlani*, but a large specimen (3 mm. long, 2 mm. high) has only 6 or 7 growth-lines.

From the Wianamatta series, Triassic, near Glenlee Homestead on the Great Southern Railway, New South Wales.

Palaeolimnadia glabra (Mitchell)

Estheria glabra Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 110, pl. 4, figs. 2, 3.

A small oval form, 4 mm. long and 2 mm. high, with only three or four concentric lirae. This is the oldest Palaeolimnadia yet known, being from the Upper Permian near Belmont, Northumberland Co., New South Wales.

Palaeolimnadia ? linguiformis (Mitchell)

Estheria linguiformis Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 111, pl. 4, fig. 4.

The carapace has a large smooth umbo, but the number of concentric lirae, 18, is high for this genus. It is from the Upper Permian near Belmont, Northumberland Co., New South Wales.

Palaeolimnadia coghlani (Etheridge, Jr.)

Estheria coghlani Cox, Proc. Linn. Soc. of New South Wales, vol. 5, 1881, p. 276. (Nomen nudum.)

Estheria coghlani Etheridge, Jr., Mem. Geol. Sur. New South Wales, 1888, p. 6, pl. 1, figs. 1–5.—Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 106, pl. 2, figs. 3–5.

At the time Etheridge wrote, the original specimens to which the specific name had been applied by Cox, had disappeared, but Etheridge published Cox's original drawings, which are poor. Mitchell unfortunately added nothing to Etheridge's rather vague description, but published fairly good photographs of one specimen each from the Cremorne and Dent Creek bore holes, and from surface outcrops at Glenlee. Cox's original specimens were from the Moore Park bore, Surrey Hills, Sydney. Etheridge states that the size of the valves from the Moore Park and the upper horizons at the Dent's Creek borings is remarkably uniform, varying from 1.25 to 2.00 mm. in length. Hence Mitchell's fig. 4 may be taken to represent a typical example, although not from the type-locality. This is probably a young shell, with a large smooth umbo and about eight growth lines. The other specimens are larger, but poorly preserved in the umbonal region.

According to Mitchell, this species ranges from the Estheria shales to the Wianamatta series, that is, throughout the Triassic.

Palaeolimnadia glenleensis (Mitchell)

Estheria glenleensis Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 108, pl. 2, fig. 6.

Carapace with a length of 4 mm., height 3 mm., 9 or 10 growth lines. From the Wianamatta series, Triassic, near Glenlee Homestead on the Great Southern Railroad, New South Wales.

Palaeolimnadia greyi (Jones)

Estheria greyi Jones, Geol. Mag., dec. 2, vol. 5, 1878, p. 100, pl. 3, fig. 1.

This species appears to have a large smooth umbonal area, below which are about 12 costellae, but near the ventral margin there are numerous close-set lirae. The figure shows radial markings, but these, according to Jones, are due to accidental compression. The specimens were found in the upper part of the Karroo series, near Cradock, Cape Colony, So. Africa.

Pemphicyclus gen. nov.

Limnadiidae with carapace oval to sub-rectangular, with a smooth umbo, on which, in the young at least, there is a prominent node which presumably represents the position of the adductor muscle. Surface with fine relatively distant growth lines (lirae or striations), and in some cases, especially in the young, irregular radial lines between the concentric ones. Genotype, *Pemphicyclus laminatus* sp. nov.

This genus appears to be allied to the modern Limnadia, especially in the presence of an umbonal node, a feature not shown by Palaeolimnadia. Whether or not it is ancestral to Limnadia it is impossible to say. Some of the species of Limnadia lack the tubercle in the adult.

Pemphicyclus laminatus spec. nov.

Plate 3, fig. 12, plate 4, figs. 1, 2

Carapace oval, moderately convex, with about 7 to 9 slightly elevated concentric lirae. The umbonal region is smooth. The young are nearly circular, highly convex, and bear a conspicuous node at about the middle of the umbo. Even the smallest specimens show 2 or more lines of growth.

This species differs from the associated *Pseudestheria plicifera* in having finer and more widely spaced concentric markings. On internal casts, the pseudo-striations produce a superficial appearance of a sort of clapboard structure.

An interesting feature is the presence in the collection of numerous young specimens, but only a few adults. The young, up to a length of at least 3.00 mm. have a conspicuous tubercle on the umbo and slightly behind the beak. Since these young forms are so numerous it would naturally be supposed that they were larvae of *Lioestheria raaschi*, but the growth lines are more widely spaced than on the beaks of specimens of that species. Moreover, equally small individuals, with crowded growth-lines and no tubercle are present in the collection, and these are probably the young of *L. raaschi*. The tubercle must have been lost at some stage, for it is present on only a single adult in the collection. This is the holotype.

The holotype is 4.00 mm. long and 3.00 mm. high. It has 7 low costellae. One of the young specimens (M.C.Z. 4783) is 1.75 mm. long and 1.00 mm. high. It has 4 lirae.

Formation and locality: The holotype, M.C.Z. 4782, is from a locality in SE ¼, NE ¼, Sec. 34, T 22 N, R 1 W, Noble Co., Oklahoma. Paratypes, M.C.Z., 4783, and 4784 are from NW ¼, NW ¼, Sec. 34, T 22 N, and no. 4785 from the same locality as the holotype. The species is common in the general region. Collected by F. M. Carpenter and G. O. Raasch.

Pemphicyclus ortoni (Clarke)

Plate 4, figs. 3, 4

Estheria sp. Clarke, Eastman-Zittell Textbook of Paleontology, 1st ed., p. 640, fig. 1333; *ibid.*, 2nd ed. p. 734, fig. 1478.

Estheria ortoni Clarke, Report of the State Paleontologist for 1900, in Univ. of the State of New York, State Museum Report, vol. 54, No. 1, 1902, p. 109 (of the Rept. of the State Paleontologist) pl. 4, figs. 5–8.

Not *Estheria ortoni* Chernyshev, Bull. du Comité Geologique, Leningrad, vol. 47, no. 5, p. 521, pl. 37, figs. 5–7, 1928.

The adult of this species differs from *P. laminatus* in having more numerous growth lines (20), in showing traces of irregular radial markings between the outer costellae, and in having a relatively larger smooth umbonal region. The larval forms differ in having irregular radial raised lines between the costellae.

Clarke states that there are about 20 concentric growth lines on a

specimen 3 mm. long, and specimens 0.5 to 1.0 mm. long have from 3 to 7.

Clarke's concluding paragraph in his description of this species should have been taken to heart by paleontologists many years ago. ". . . we are probably encouraging misconception by permitting these ancient phyllopods to pass under the name Estheria, whose type forms all pertain to the existing fauna." He also calls attention to the fact that his species is more like a Limnadia than an "Estheria."

His specimens were from the "Lower Barren Measures" (Conemaugh) of Carrollton, Ohio.

Pemphicyclus chernyshevi spec. nov.

Estheria ortoni Chernyshev, (*nec* Clarke), Bull. du Comité Geologique, Leningrad, vol. 47, 1928, no. 5, p. 521, pl. 37, figs. 5–7.

The species which Chernyshev identified as *E. ortoni* Clarke undoubtedly belongs to the same genus, but differs in being almost as high as long, hence is almost square. The beak is subcentral, further back than in *P. ortoni*. There are 10 lirae on an adult. They are higher and sharper than in the Ohioan species, and considerably coarser.

The most interesting fact about this species is that the tubercle is retained in the adult, showing close kinship with the modern Limnadia, and also with *P. laminatus*.

Chernyshev reports that his specimens came from beds in the Donetz coal basin which are equivalent to the "Lower Barren" measures of Ohio, that is, Westphalian.

Estheriina Jones

Estheriina Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 195.

Umbonal regions swollen, the ventral portion flattened. There is an abrupt descent from one to the other. On the umbonal region the lines of growth are sharp and widely spaced, whereas on the flattened area they are numerous and close together. Genotype, *Estheriina bresiliensis* Jones.

Estheriina bresiliensis Jones

Plate 4, figs. 5, 6

Estheriina bresiliensis Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 198, pl. 8, figs. 1a-c, 2a,b,3,4,5.

As Jones has said, the umbonal and subumbonal regions are strikingly set off from the major portion of the valves, a feature to be seen to a certain extent in the modern Limnadia. Between the somewhat raised concentric lirae the surface is densely pitted. A typical specimen is 6.4 mm. long and 5 mm. high, the umbonal portion being 3.6 mm. long and 2.4 mm. high. These fossils were collected from strata of undetermined age, probably Cretaceous, near Bahia, Brazil.

Jones assigned *Cardinia freysteini* Geinitz[1] to this genus, but the writer fails to see the similarity. The same may be said of *Estheria limbata* Goldenberg,[2] which Jones has referred to Estheriina.

Estheriina expansa Jones

Estheriina expansa Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 201, pl. 8, fig. 6a, 6b.

Estheriina astartoides Jones

Estheriina astartoides Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 201, pl. 8, fig. 7, 8a, 8b.

Limnestheria Wright

Genotype, *Limnestheria ardra* Wright, Proc. Roy. Irish Acad., vol. 35, sec. B, 1928, p. 196, text figs. 1–5, pls. 24, 25.

This species occupies an unusual position among the fossil Conchostraca, for 20 specimens were found with more or less of the appendages preserved. Those best shown are the antennae, mandibles, the first pair of clasping organs, and the telson. Some of the specimens show vague traces of other organs, but give no real information.

Miss Wright points out that the appendages are similar to those of the modern Cyclestheria and Limnetis (Lynceus), except for the absence of a second pair of claspers. This characteristic is the one on which she bases the new genus Limnestheria.

Unfortunately, the carapaces of these specimens are poorly preserved. She describes the shell only as "oval, probably equi-valve, 5–6 mm. in length and 3 mm. high." She figures two fairly well preserved shells (her figs. 3 and 4). If they show the important characteristics, there is a large smooth umbonal region, larger than in any of

[1] Verstein. der Steinkohl. in Sachsen, 1855, p. 2, pl. 35, figs. 7, 7a.; *Estheria freysteini* Geinitz, Sitz.-Berichte der Naturw. Gesell.; Isis in Dresden, for 1879, p. 10, pl. 1, figs. 2a, 2A; Reed, Geol. Mag., dec. 4, vol. 4, p. 199, pl. 8, figs. 9, 10.

[2] Fauna Saraep. Fossilis, heft 2, 1877, p. 43. pl. 2, figs. 12, 14. Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 200, pl. 8, fig. 11.

the other genera known as fossils, and reminding one of the modern Limnadia and Eulimnadia. This may be taken as the generic characteristic in our present artificial classification based upon the carapaces alone.

The specimens were found in the Coal Measures in the core from a bore-hole at Ardra, in the Kilkenny district in Ireland.

Limnadopsis Spencer and Hall

Rept. Horn Exp. Centr. Australia, vol. 2, 1896 p. 328.

"Carapace compressed, . . . the union between the two halves . . . extending along the whole length of the dorsal line, which is raised into a much compressed spined keel. Lines of growth ten to fifteen clearly marked, thread-like ridges; the intervals between the more recent lines of growth continued on the dorsal keel into backward directed spines, the posterior edges of which are formed by the lines of growth, spines decreasing in size from behind forward."

No genotype was designated, but in the Zoölogical Record, volume for 1895, Crustacea, p. 32, is the statement "Limnadopsis, n.g. for *L. brunneus* n. sp. in a lagoon near Port Darwin, N. Territory, and for *L. squirei* and *L. tatei* n. spp.," etc. It happens that *L. brunneus* was the third instead of the first species described. I do not know if the above citation can be considered a designation of the genotype, but I herewith place *Limnadopsis brunneus* Spencer and Hall in that position. This species differs markedly from *Limnadopsis squirei* Spencer and Hall, in having a straight instead of a curved hinge.

Daday de Deés[1] considered *L. squirei* a synonym of *Estheria brichii* Baird, and changed the spelling of the generic name to Limnadiopsis. This is correct, but I see no objection to retaining the original form.

The generic diagnosis, so far as the shell is concerned, may perhaps be translated as follows.

Carapace suboval, with straight or curved hinge, the beak anterior, not conspicuous. Dorsal margin more or less serrate, growth-lines relatively few, further apart on the posterior than on the anterior part of the shell. The distal growth-lines recurve posteriorly on the greater part of the carapace, whereas they turn forward in the umbonal region. Genotype, *Limnadopsis brunneus* Spencer and Hall.

Members of this genus are fairly common in Australia at the present time. Their ancestors seem to have had a world-wide distribution.

[1] Ann. des Sci. Naturelles, Zoologie, ser. 10, vol. 8, 1925, p. 177.

LIMNADOPSIS SIBERICENSIS spec. nov.

Estheria amurensis Chernyshev, (*partim*), Geol. and Prospecting Service, U.S.S.R., Bull. **49**, no. 10, 1930, pl. 1, fig. 5.

The recurved growth-lines shown in this figure are definitely of the Limnadopsis type, and the hinge appears to be serrate. It is interesting to find this early representative of the genus in the Cretaceous of Siberia.

LIMNADOPSIS ? CHILENSIS (Philippi)

Estheria ? *chilensis* Philippi, Tertiären und Quartären Versteinerungen Chiles, Leipsig, 1887, p. 223, pl. 50, fig. 11.

Not *Estheria chilensis* Jones, Geol. Mag., dec. 4, vol. 4, 1897, p. 289, pl. 10, figs. 4 (*nec* fig. 5).

There is considerable similarity in outline between the specimens which Jones and Philippi figured, but there can be no doubt that two species are covered by this name. As Jones suggested, Philippi's specimen strongly suggests Cyclestheria, but the beak is not so far forward as in that genus, nor is the outline so nearly circular. The few growth lines and the smooth umbo indicate that it is probably a Limnadopsis. Unfortunately neither the age nor the exact locality of the beds from which Philippi's specimen was obtained are known. Lebu, on the coast of Chili has been recorded, without supporting authority.

The *Estheria chilensis* of Jones has more growth lines than does Philippi's specimen, and is less quadrate.

PALEOLIMNADIOPSIS gen. nov.

Limnadiidae similar to the modern Limnadopsis in that the growth lines are few, widely spaced, and recurved at the dorsal margin, but differing in lacking spines on the dorsal margin, and in having a somewhat straighter hinge. There are no radial markings. Genotype, *Palaeolimnadiopsis carpenteri* sp. nov.

The generic name is suggested by the similarity to the modern Limnadopsis Spencer and Hall,[1] the chief difference in the shells being that the dorsal margin is serrated in the modern forms and smooth in the fossils. Curiously enough, the modern species of Limnadopsis are Australian. It would be interesting to know when they reached the island continent. Only one of the described fossil species from that region, *Estheria glenleensis* Mitchell[2] from the Triassic can be suspected

[1] See particularly, Daday de Deés, Annales des Sci. Naturelles, Zoölogie, ser. 8, vol, 10. 1925, pp. 175–184.

[2] Proc. Linnean Soc. New South Wales, vol. 52, 1927–28, p. 108, pl. 2, fig. 6.

of being a Palaeolimnadiopsis. Unfortunately the costellae have been inked in on the photograph, so that it is impossible to see whether or not they are reflexed at the dorsal margin.

Palaeolimnadiopsis carpenteri spec. nov.

Plate 4, figs. 7, 8, plate 5, figs. 1, 2

Individuals large, moderately convex, the region about the umbo relatively smooth, the other two-thirds of the shell showing broad low undulations. The pseudo-striae are close together on the smoother part of the shell, progressively further apart on the undulatory portion, where they follow the crests of the ridges. All of the specimens are casts, showing no trace of the shell.

There is a good deal of variation among the half dozen specimens in the collection. On some the undulations are much higher and more prominent than on others, and in such specimens they appear near the beak, so that the smooth area is small. The holotype, which is the largest specimen, 42.00 mm. long, has 10 low, broad undulations. A small specimen, 23.00 mm. long, also has 10 undulations, 9 of which are high, but the outermost is low. This seems to indicate that there was intersticial growth in the shell, which tended to smooth out the ridges with advancing age.

Measurements: The holotype of this species is the largest conchostracan known, either living or fossil. It is 42.00 mm. long and 28.00 mm. high. It is interesting to note that the genus Limnadopsis contains the largest modern conchostracans, *Limnadopsis brichii* (Baird) reaching a length of 27 mm. and a height of 20 mm.

The smallest specimen of *P. carpenteri* is 12.25 mm. long and 8.00 mm. high. It has 7 narrow concentric folds, and another broader one next to the ventral margin.

Horizon and Locality: Wellington formation, Noble Co., Oklahoma. G. O. Raasch and F. M. Carpenter, collectors. The holotype is no. 4705, and the paratypes are nos. 4706 and 4789 in the Museum of Comparative Zoölogy. The holotype is from a locality in NW ¼, SW ¼, Sec. 20, T 22 N, R 1 W, but the majority of the specimens were found in SW ¼, NW ¼, Sec. 2, T 21 N, R 1 W.

Palaeolimnadiopsis ? eifelensis spec. nov.

Estheria diensti Gross (*partim*), Senckenbergiana, vol. 16, 1934, pl. on p. 311, fig. 2 (non figs. 1, 3–6, 8, 9.)

The posterior end of this specimen is not fully shown in the figure, and the shape and recurved direction of some of the growth-lines may be due to crushing, but this specimen appears to be a Palaeolimnadiopsis. If so, it is the oldest known, for it was collected from the Lower Devonian of the Eifel district in Germany.

Palaeolimnadiopsis ? tenuipectoralis (Jones)

Estheria striata (Münster) var. *tenuipectoralis* Jones, Ann. Mag. Nat. Hist., ser. 5, vol. 12, 1883, p. 246, pl. 6, fig. 2.

The single specimen is so poorly preserved that the generic reference is unsatisfactory. The posterior margin is imperfect, but the growth lines, only partially shown in the figure, seem to be recurved at the dorsal margin, which is straight. It is from the Lower Carboniferous at Kamensk, east of the Urals.

Palaeolimnadiopsis jonesi spec. nov.

Estheria dawsoni Jones, Geol. Mag., dec. 2, vol. 5, 1878, p. 100, pl. 3, fig. 2.

Not *Estheria dawsoni* Jones, Geol. Mag., dec. 1, vol. 7, 1868, p. 220, pl. 9, fig. 15, or Geol. Mag., dec. 3, vol. 1, 1884, p. 361, pl. 12, fig. 12.

Not *Estheria* (*Euestheria*) *dawsoni* Pruvost, Terrain Houiller de Nord et du Pas-de-Calais, 1919, p. 55, pl. 24, figs. 24–28 bis, nor *Estheria* (*Euestheria*) *dawsoni* Pruvost, Mem. Mus. Royal d'Hist. Nat. de Belgique, No. 44, 1930, p. 185, pl. 10, figs. 7, 8.

Not *Estheria* (*Euestheria*) *dawsoni* Chernyshev, Bull. du Comité Geologique, Leningrad, vol. 47, 1928, no. 5, p. 519, pl. 37, figs. 1–3.

Jones gave the name *Estheria dawsoni* to a species which Dawson[1] had figured as Estheria. He had better specimens than Dawson had obtained, but from the same locality near Horton Bluff, Nova Scotia. The age, according to W. A. Bell[2] is about that of the upper part of the Pocono of the Lower Mississippian.

In 1878, Jones figured another specimen from the lowest Carboniferous east of Belhaven Bay, near Dunbar, Scotland.

This is not at all like the Nova Scotian specimens, the hinge being extended behind in a spine-like projection, so that, as Jones says, the outline of the posterior margin is sigmoid. There are from 11 to 12 concentric costellae, rather widely spaced.

[1] Acadian Geology, 1868, p. 256, fig. 58d.

[2] Trans. Roy. Soc. Canada, 1927, section 4, 1927, table opposite p. 108.

It differs from *P. carpenteri* in its much smaller size, and from the species next to be described in having fewer and more widely spaced costellae.

It is only fair to Jones to say that in 1884 he realized that the Nova Scotian and Scottish specimens did not belong to the same species.

Palaeolimnadiopsis pruvosti spec. nov.

Estheria (*Euestheria*) *dawsoni* Pruvost (*nec* Jones), Terrain Houiller de Nord et du Pas-de-Calais, 1919, p. 55, pl. 24, figs. 24–28 bis (not text figure 14). —Mem. Mus. Royal d'Hist. Nat. de Belgique, No. 44, 1930, p. 185, pl. 10, figs. 7–8.

Estheria (*Euestheria*) *dawsoni* Chernyshev, Bull. du Comité geologique, Leningrad, vol. 7, 1928, no. 5, p. 519, pl. 37, figs. 1–3.

This species has the same general shape and other characteristics as *P. jonesi*, but differs in having more numerous and more closely spaced costellae.

It has been reported by Pruvost from the lower and middle Westphalian strata in northeastern France and from the lower Westphalian of southwestern Belgium. Chernyshev's specimens were from the Westphalian of the Donetz basin.

Palaeolimnadiopsis subulata (Reed)

Estheria subulata Reed, Serv. Geol. e. Min. do. Brasil, Bol. n. 34, 1929, p. 6, 7, pl. figs. 9–11.

Reed has described from Brazil a typical member of this genus, specifically characterized by an unusually large smooth umbonal region. The length is 9 mm., height 6 mm.

The specimens are from red beds supposed to be Permian at Valloes village on the Iguassu River, Brazil.

Palaeolimnadiopsis muensteriana (Jones and Woodward)

Estheria striata var. *muensteriana* Jones and Woodward, Geol. Mag., dec. 3, vol. 10, 1893, p. 529, pl. 19, figs. 1, 2.

The hinge is straight, the posterior margin slightly sinuous, and the growth-lines recurved at the dorsal margin. There is no interstriate ornamentation. Jones and Woodward considered it to be closely allied to *Estheria striata beinertiana* Jones. It is from the Permian at Altenstadt in the Wetterau, Hesse, Germany.

PALAEOLIMNADIOPSIS ? REINACHII (Jones and Woodward)

Estheria reinachii Jones and Woodward, Geol. Mag., dec. 3, vol. 10, 1893, p. 531, pl. 19, fig. 3.

The figures of this form do not show the whole course of the growth lines but it appears to belong to the above genus. It is shorter and deeper than *P. muensteriana*, which is also found in the Permian near Altenstadt, Hesse, Germany.

ANOMALONEMA gen. nov.

Limnadiidae allied to Palaeolimnadiopsis, differing from it in having interrupted radial lirae on the carapace. Genotype, *Estheriella reumauxi* Pruvost.

The genotype is the name-member of Pruvost's "Groupe de l'*Estheriella reumauxi* Pruvost", mentioned on a previous page. The reflexed growth lines and sinuous posterior margin show clearly that it is closely related to Palaeolimnadiopsis. None of the other species mentioned by Pruvost as members of this group shows these characteristics. They are here referred to Dadaydedeesia. I have been unable to find any other species which can be said definitely to belong to the genus.

ANOMALONEMA REUMAUXI (Pruvost)

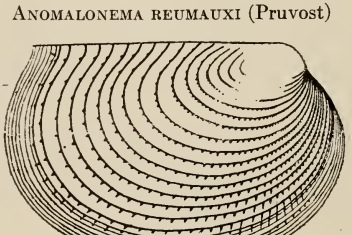

Fig. 3. *Anomalonema remauxi* (Pruvost). Genotype. A diagramatic figure, from Pruvost. x about 9.

Estheriella reumauxi Pruvost, Ann. Soc. géol. du Nord, vol. 11, 1911, p. 61, pl. 1, figs. 1–3. Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 63, text-fig. 16, pl. 24, figs. 3, 4, 35.

?*Estheriella reumauxi* Chernyshev, Annuaire de la Soc. Paleontologique de Russie, vol. 6, 1926, p. 72, pl. 7, fig. 11.

This species is so similar to *Palaeolimnadiopsis pruvosti* that it would be difficult to identify any but well preserved specimens. The length is given as from 5 to 6 mm., the height as from 3.5 to 4.5 mm. It is from the Westphalian of northeastern France.

The specimen which Chernyshev figures from Russia has a somewhat different outline, the hinge being much shorter. It was found in the Westphalian of the Donetz basin.

Anomalonema ? raricostata (Chernyshev)

Estheriella raricostata Chernyshev, Annuaire de la Soc. Paleontologique de Russie, vol. 6, 1926, p. 73, pl. 7, figs. 12–14.

The illustrations of this species are so poor that it is not possible to be sure whether or not the typical reflexed curvature of the growth lines is present. Westphalian, Donetz Basin, Russia.

Anomalonema ? densicostata (Chernyshev)

Estheriella densicostata Chernyshev, Annuaire de la Soc. Paleontologique de Russie, vol. 6, 1926, p. 75, pl. 7, figs. 15, 16.

The same remarks apply to this as to the previous species.

Family CYCLESTHERIIDAE Sars

Carapace laterally compressed, with few and indistinct growth-lines. Shell almost circular, with beaks far forward.

Cyclestherioides gen. nov.

Cyclestheriidae with the beak a bit further back than in the modern Cyclestheria. Genotype, *Estheria lenticularis* Mitchell.

So far as one can judge from the nature of the shell, both Cyclestheria and Cyclestherioides are closely related to Limnadia. If *Estheria lenticularis* were a modern form, it would doubtless be placed in the genus Cyclestheria, but since it is Permian, a more conservative course seems to be indicated.

Cyclestherioides lenticularis (Mitchell)

Plate 5, fig. 3

Estheria lenticularis Mitchell, Proc. Linn. Soc. of New South Wales, vol. 52, 1927, p. 109, pl. 4, fig. 7.

"Carapace lenticular, small, smooth; beak subanterior, incon-

spicuous; concentric striae very fine six or seven in number; interspaces increase in width as they approach the ventral margin." (Mitchell).

Newcastle coal measures, associated with various species of Glossopteris, Upper Permian, Merewether Beach, near Newcastle, New South Wales.

INCERTAE SEDIS

Rhabdostichus nov.

Conchostraca with concentric undulations separated by striae. Costellae and other surface markings absent. Beak subcentral. Genotype, *Estheria pulex* Clarke.

Except for the position of the beak, the above definition would apply to many modern estherioids. Few of them show raised concentric costellae, a depressed line or striation marking the contact of the added increment with the older part of the shell.

Rhabdostichus pulex (Clarke)

Plate 5, fig. 4

Estheria pulex Clarke, Am. Journ. Sci. Ser. 3, vol. 23, 1882, p. 476, pl. fig. 4.—Packard, Mon. No. Am. Phyllopod Crust., 12th Ann. Rept., U.S. Geol. Sur., 1883, p. 355.—Hall and Clarke, Pal. N.Y., vol. 7, 1888, p. 206, pl. 35, figs. 10, 11.

This little shell (½ mm. long and ⅔ mm. high) has six or seven concentric undulations with narrow impressed lines (striae) between. The beak is subcentral, and, apparently, the hinge slopes both backward and forward from the beak. There are no other surface markings.

One cannot be sure that it is really a conchostracan branchiopod, but it has as many characteristics of that group as do the shells of many modern "Estheriidae," and shows no features that would suggest affinities with any other group.

It was found in marine strata of the Middle Devonian (Hamilton), associated with ostracods and a Discina. Clarke thought the specimens might have been washed into the sea from a pool of fresh water temporarily formed on a flat sea shore. There is, however, no proof that there was any shore line near the locality, Hopewell, Ontario Co., New York, during Hamilton time. It may be that this is actually one of the marine ancestors of the fresh-water Conchostraca. It is certainly simple enough to serve as one.

RHABDOSTICHUS BUCHOTI (Péneau)

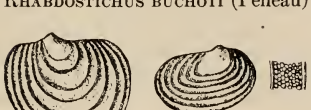

Fig. 4, a, b, c. *Rhabdostichus buchoti* (Péneau. From Péneau. x about 7.

Estheria (*Euestheria*) *buchoti* Péneau, Bull Societé Sci. Nat. de l'Ouest de France, ser. 5, vol. 6, 1937, p. 221, text figs. 2a–d.

The general configuration and small number of growth lines (6 or 7) on this form strongly suggest *Rhabdostictus pulex* (Clarke). The surface is, however, very finely reticulate as in Euestheria and Asmussia, and the shell is much longer, (4.7 mm.).

It was found in considerable numbers in the schists of Moulin de Régereau in the Armoricain Massif. The age of the beds is in doubt. Péneau was inclined to think it Silurian, because of the presence of a Bolbozoë similar to *B. anomala* Barrande, a Bohemian Silurian species. He admits, however, that it may be Devonian. The fauna is a small, rather curious one, but definitely marine, which fits well with the conditions under which *R. pulex* occurs.

SPECIES INSUFFICIENTER COGNITAE

POSIDONIA PARVA Lea

Posidonia parva Lea, Proc. Acad. Nat. Sci., Philadelphia, vol. 8, 1856, p. 77. Triassic.

POSIDONIA OVALIS Emmons

Posidonia ovalis Emmons, Geol. Rept. North Carolina., 1856, p. 323, fig. W, 1, 2;—American Geology, pt. 6, 1857, p. 40, fig. 12;—Manual of Geology, 2d ed., 1860, p. 191, fig. 166, 3.

Estheria ovata Jones (*partim*) Palaeontog. Soc., London, 1863, p. 84.

Jones, in his Monograph of 1863, placed all of the American Triassic "Estherias" in one species, and adopted Lea's name *ovata* for them. Although Phoenixville, Penna. was the type-locality for *E. ovata*, the specimens Jones figured were from the vicinity of Richmond, Virginia, and the Dan River in North Carolina. The latter was probably Em-

mons' type-locality for *P. ovalis*, although he stated that the species was common in the vicinity of Richmond. Jones had material from Phoenixville in his possession before his Monograph was published but probably did not receive it until after the drawings had been made.

Later, Jones described two new species from the Triassic of Pennsylvania, *Estheria hindei* and *E. lewisii*. After describing the latter species, he proceeded to an analysis[1] of the characteristics of "*E. ovata*" as shown in his figures of 1863. These are all on his plate 2. Although he made no statement to that effect, it is obvious that in 1890 he was doubtful about his earlier identifications of Lea's species.

A brief synopsis of his analysis, which can easily be checked by reference to his figures follows.

Fig. 26, 27. From Prince Edward, near Richmond, Va. Concentric lines, wide apart.

Fig. 28. Harding's pit, near Richmond. Concentric lines numerous and close together.

Fig. 29, 30. Concentric lines wide apart, interspaces smooth.

Fig. 31.

Fig. 32. Richmond. Reticulate interspaces, like those of *Estheria minuta*.

Fig. 33. Richmond. Small reticulation like that of *E. minuta* var. *brodieana*.

Figs. 34, 35. Dan River, North Carolina. Reticulate interspaces like those of fig. 32.

Fig. 36. Richmond. Reticulate.

Fig. 37. Dan River. Columnar interstitial ornament, like that of some Wealden specimens, and in the recent *Estheria similis*.

Fig. 38. Richmond. Interspaces filled with coarse parallel thread-like lines, one separated from another by a row of small pits.

It now appears, by his own evidence, that Jones included four genera and an undetermined number of species under the name *Estheria ovata* Lea. Figures 26, 27, 29, 30, and 31, all drawn from specimens found near Richmond, Virginia, represent a species of Pseudestheria, probably *P. ovata*. Fig. 28 is a picture of a Lioestheria, which I have described in this paper as *L. inornata*. Good specimens of both of these forms were figured, but figures 32 to 38 represent mere patches of the carapace, and we do not know what the whole shell looked like. Figures 32–36 all show polygons in the intervales. They obviously represent Euestheria, but whether one or two species it is impossible to say. Some of them are from Dan River, some from Richmond. It

[1] North American Estheridae, Geol. Mag., dec. 3, vol. 7, 1890, p. 386.

may be that this is *Estheria ovalis* but we cannot be certain, because of figures 37 and 38. In all probability they represent two species of Bairdestheria. Unfortunately one of the specimens from which they were drawn came from Dan River, the other from Richmond. Hence so far as can now be determined, *Posidonia ovalis* might be a Eustheria or a Bairdestheria. Or, if there is a slip in this attempt at elimination, it may belong to some other genus. All of which indicates the importance of properly labeling types and depositing them in a safe place.

Posidonia triangularis Emmons

Posidonia triangularis Emmons, Geol. Rept. North Carolina, p. 338, fig. V;—American Geology, pt. 6, p. 134, fig. 104.

Estheria ovata Jones, (*nec* Lea), Palaeontog. Soc., London, 1863, p. 86, text-fig. 7.

Estheria spec. indet.

Estheria sp. ind. Haynes, Science, N.S., vol. 37, 1913, p. 192, fig. 2.

The specimen which Haynes figured is an indeterminable object, possibly the scale of a fish. The growth lines enclose a smooth area which is not marginal, as it should be in a conchostracan. Only one of the "several specimens" which Haynes mentioned is identifiable. It is described on a previous page as *Pseudestheria blackstonensis.*

Estheria dawsoni Packard

Plate 5, fig. 5

Estheria dawsoni Packard (*nec* Jones), Am. Nat. vol. 15, 1881, p. 496.

Packard described, but did not figure, an "Estheria"? from the well-known post-Glacial Mallotus beds on Green's Creek, east of Ottawa, Ontario. Unfortunately, he named it for Sir William Dawson, who had already been honored when T. Rupert Jones described *Estheria dawsoni* from the Lower Carboniferous of Nova Scotia.

Dr. Thomas H. Clark has loaned me a specimen which I designate as the holotype of this species. (Peter Redpath Museum, McGill Univ. No. 6353.) It has numerous slender costellae, at least 10 per millimeter in the middle of the carapace. As Packard says, it differs from any modern "Estheria" in that "the lines of growth are much thicker, higher and closer together." There are no radial markings, but Packard seems to have seen rows of papillae for the insertion of spinules. Packard believed that it was most closely related to *Cyzicus jonesii* (Baird), a form now living in Cuba.

The specimen is crushed flat and the umbonal region is covered with clay which it is not now safe to try to remove. It is therefore impossible to determine the exact position of the beak, if one exists. One assumes, from the direction of the concentric lirae that it is a left valve and that the beak was sub-central. The form is oval, about two-thirds as high as long. The anterior and ventral outlines are moderately convex, but in the middle of the posterior outline there is a curious angle, above which the outline is straight. The growth lines follow the outline. The peculiar posterior angle arouses the suspicion that this may be a teleostean fish-scale, and Mr. William Schroeder would identify it as such. He thinks that it belonged to a herring about a foot long. This would be unusually large for a *Mallotus villosus*, but it may have come from some larger fish.

Family LEAIADIDAE nov.

Conchostraca with two or more widely divergent radial carinae, or rarely, smooth-topped ridges, the areas between which are concave. Concentric markings relatively few, consisting of lirae rather than costellae.

A typical Leaia differs so much from the other Conchostraca that one is tempted to make a separate super-family for the group. But on careful study, it seems that the only real difference of the members of this family from other "estherids" lies in the curious concavity of the areas between the radial ridges. It is probable that the family is artificial, and polyphyletic. It appears to be chiefly Carboniferous, its greatest abundance being in the Westphalian and Stephanian. Only one species is known from the Permian. This is described in this paper from a few specimens collected by Dr. Carpenter and Mr. Raasch from the Wellington formation in Oklahoma. Several of the associated fossils in these beds have a Pennsylvanian aspect. As is well known, many Pennsylvanian marine invertebrates survived in the Nebraska, Kansas, Oklahoma region for some time after the beginning of the Permian, hence it is not surprising that the same should be true of the non-marine invertebrates.

Leaia Jones (emend.)

Paleontog. Soc., London, vol. for 1862, 1863, p. 115.

Carapace rectangular to sub-rectangular, with two or three carinate

radial ridges, one of them near the dorsal margin. Genotype, *Cypricardia leidyi* Lea.

In view of the considerable variation among the various species which have been referred to the genus Leaia, it seems advantageous to restrict the name to the forms which are more or less rectangular in outline. In this group the posterior margin is approximately straight, or has a slight reëntrant just below the hinge, and in some species the growth-lines are slightly recurved at the dorsal margin, suggesting Limnadopsis, which is allied to Palaeolimnadiopsis and Anomalonema. In neither of these genera is radial ribbing present, but the shape of the posterior border, which reflects the course of the growth-lines, is about the same as in some species of Leaia. Hemicycloleaia, however, has none of these characteristics and is much more like Monoleiolophus. The Devonian Praeleaia may well be a relative of Euestheria. It is difficult to come to any definite conclusion about these fossils, since they are known from carapaces only.

Stanier was, so far as I can find, the first to point out that the species of Leaia could be divided into two groups, one with the ventral border straight or nearly straight, the other with a ventral border with rounded outline. There are numerous intergradations between the two sorts, but the typical representatives are so distinctive that it seems worth while to give a new generic name (Hemicycloleaia) to the species with the more or less semicircular outline. Pruvost's article[1] on Leaia is by far the most important contribution to the subject. He brought together the ideas of Laspeyres and Stanier, and showed how they applied to the species known at that time. If I must differ in some respects from Pruvost, a personal friend, it must be remembered that the points of view have changed a good deal in 30 years.

Pruvost adopted the suggestion of Laspeyres[2], that the angles at which the principal carinae diverge from the line of the hinge should be considered as important. The angle of the anterior carina is designated as alpha, that of the second one beta. Pruvost found that the Dinantian (Mississippian) species showed a value for α ranging between 70° and 80°, whereas those from the Westphalian had an α of about 90°, and the Stephanian species had an α of about 100° to 110°.

[1] Ann. Soc. Geol. du Nord., vol. 43, 1914, p. 254–281.
[2] Zeitsch. der Deutsch. Geol. Gesellsch., vol. 22, 1870, p. 773.

Leaia leidyi (Lea)

Cypricardinia leidyi Lea, Proc. Acad. Sci., Philadelphia, vol. 7, 1855, p. 341, pl. 4.

Leaia leidyi Jones, Paleontog. Soc., London, 1863, p. 116, pl. 5, figs. 11, 12;—Packard, 12th Rept. U. S. Geol. Sur. Territories. 1882, p. 358, fig. 24;—Jones, Geol. Mag., vol. 7, 1870, p. 219, pl. 2, fig. 7; Geol. Mag. dec. 3, vol. 1, p. 361, pl. 12, fig. 13;—Laspeyres, Zeitsch. der Deutch, Geol. Gesells., vol. 22, 1870, p. 743, pl. 16, fig. 3;—Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 261, text-fig. 1.

Not *Leaia leidii* Dawson, Acadian Geology, 1868, p. 256, fig. 78c.

Shell sub-rectangular, outline slightly convex at front, almost straight behind. As measured on figures of the type, the angle α is 77°, β is 33°. There are about 12 lirae. The specimens were from the Mauch Chunk shale, one mile southeast of Pottsville, Penna.

Leaia laevicostata spec. nov.

Fig. 5. *Leaia laevicostata* Raymond. Holotype. x 6.

Carapace subrectangular, the height being to the length as about 8–13. Both radial ridges are rounded, slightly nodose. The anterior one is straight, α being about 90°. β is about 25°, which is unusually low. The holotype is 3.25 mm. long, 2.00 mm. high. There seem to be 7 or 8 lirae, with intervals slightly wider than themselves. Another specimen, 5 mm. long, has 14 lirae. All data on this species are approximate, for the specimens are not well preserved and the ridges are obscure. It differs from *L. leidyi* in its smoother ridges, more numerous lirae, and the greater value of α.

The holotype is from the Cheverie formation, (Mississippian) on the shore of the Avon River, opposite Horton Bluff, Nova Scotia. It is no. 9449 in the Museum of the Geological Survey of Canada and was collected by Dr. Walter A. Bell.

Leaia williamsoniana Jones

Leaia leidyi var. *williamsoniana* Jones, Paleontog. Soc., London, 1863, p. 117, pl. 1, figs. 19, 20.

Leaia williamsoniana Laspeyres, Zeitschr. der Deutsch Geol. Gesells., vol. 22, 1870, p. 743, pl. 16, fig. 3; — Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 269, text-fig. 6.

This is a typical Leaia, rectangular except for the rounded anterior margin, the anterior carina straight, and the angle α 90°. It is from the Westphalian of Lancashire, England.

Leaia subquadrata spec. nov.

Leaia leidyi Jones (*nec* Lea), Geol. Mag., vol. 7, 1870, p. 219, pl. 9, fig. 11a-c (not figs. 12, 13, 14).

Leaia leidyi var. *salteriana* Jones 1884, (*nec* Jones 1863), Geol. Mag., dec. 3, vol. 1, 1884, p. 362, pl. 12, fig. 13.

Jones figured under this name, but did not describe, a subquadrate Leaia from the Coal Measures on Cilfach-bargoed-fawr farm, about 1½ miles southwest of Bedwelly church, Glamorganshire, Wales. Pruvost later referred it to *L. tricarinata*, from which it differs in being proportionally much higher and in having the characteristics of a true Leaia. In 1884 Jones republished the same figure, and referred the specimen to his variety *salteriana*. In this article he cites the form as occurring at Horton in Nova Scotia and includes a reference to Dawson's figure 78e, p. 256, in "Acadian Geology."

The carapace is irregularly subquadrate, three fourths as high as long, with about 14 or 15 fine lirae, which have a straight course between the first and second carinae. The angle α is about 97°, β is about 52°. The lirae are distantly spaced, as in *L. pruvosti*, but it differs from that species in having a higher value for angle α. The two forms are, however, probably closely related. The length is 5.6 mm., and the height 4.2 mm.

Leaia spec. ind.

Leaia leidyi Dawson (*nec* Lea), Acadian Geology, 1868, p. 256 (footnote), text fig. 783.

Leaia leidyi var. *salteriana* Jones 1884, (*nec* Jones 1863), Geol. Mag. dec. 3, vol. 1, 1884, p. 362 (not pl. 12, fig. 13).

The figure shown by Dawson represents a carapace similar to that of *L. subquadrata*. It has the same high form, subquadrate outline,

and about the same value for the angle α. The figure shows 10 widely spaced lirae, a smaller number than in *L. subquadrata*. The length is about 7 mm. and the height about 4 mm. Dawson's specimens came from near the Strait of Canseau, where the rocks, according to Dawson, are of the same age as those near Horton, Nova Scotia, that is, Mississippian.

Leaia paralella spec. nov.

Leaia leidyi Jones (*nec* Lea), Geol. Mag. vol. 7, 1870, p. 219, pl. 9, figs. 13, 14 (not figs. 11, 12).

Carapace subrectangular, of the form characteristic of the true Leaia. Lirae fine, distantly spaced, about 11 in number. The angle α is about 80°, β about 27°. The length is 4.6 mm., the height 2.7 mm.

It is remarkable that a species of this type should be found associated with such forms at *L. subquadrata* and *L. cymruensis*. Both of these have values for angle α which would suggest Stephanian age, whereas the present species has the angle which one finds ordinarily in Dinantian forms. It is probably closely related to *L. leidyi*, differing chiefly in the angles at which the carinae are placed.

Two specimens were figured by Jones from the Coal Measures on Cilfach-bargoed-fawr farm, about 1½ miles southwest of Bedwelly Church, Glamorganshire, Wales.

Leaia cymruensis spec. nov.

Leaia leidyi Jones (*nec* Lea), Geol. Mag., vol. 7, 1870, p. 219, pl. 9, fig. 12 (not figs. 11, 13, 14).

This is another of the forms from the Coal Measures in Glamorganshire. It has a more normal shape for a Leaia than *L. subquadrata* does. The ventral outline is somewhat convex, but the course of the lirae between the first and second carinae is straight. The lirae are closely spaced, there being 17 or 18 on the figured specimen. The length is 5.4 mm. and the height 3.5 mm. The angle α is about 100° and angle β is about 45°.

Leaia bristolensis spec. nov.

Leaia leidyi var. *salteriana* Bolton (*nec* Jones), Quart. Journ. Geol. Soc., London, vol. 67, 1911, p. 325, pl. 27, figs. 5, 6.

Judging from the figures, which are excellent, this is a real Leaia, although superficially similar to *Hemicycloleaia tricarinata* (Meek and

Worthen). The holotype is 4. mm. long, 3. mm. high, and has about 17 lirae. The angle α is about 100°, and β about 50°. The anterior carina is slightly curved, and the dorsal one prominent. It was found in Westphalian strata near Bristol, England.

Leaia pruvosti spec. nov.

Leaia tricarinata forme *minima* Pruvost (*partim*), Ann. Soc. Geol. du Nord, vol. 43, 1914, pl. 2, fig. 12 (non figs. 9–11); -Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 67, pl. 25, fig. 3, (not figs. 1, 2, 4).

This species differs from other Leaias in being shorter and higher. The angle α is 90°, β is 45°. Another outstanding feature is the width of the spaces between lirae, there being only 7 or 8 of the latter on the holotype. The length is 3.6 mm. and the height 2.6 mm.

This species somewhat resembles *L. bristolensis* Raymond although it is shorter and higher. They differ also in the course of the lirae behind the second carina. In *L. bristolensis* the lirae meet the third carina almost at right angles, although there is a suggestion of a slight backward turn. The lirae of *L. pruvosti* turn forward as they approach the third carina.

The specimen is from the lower Westphalian, zone A2, at Aniche, northeastern France.

It is named for Professor Pierre Pruvost, expositor of the non-marine faunas of the Carboniferous of northeastern France and Belgium.

Leaia barroisei spec. nov.

Leaia tricarinata forme *minima* Pruvost (*partim*), Ann. Soc. Geol. du Nord, vol. 43, 1914, pl. 2, figs. 8, 9 (not figs. 10, 11, 12); Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 67, pl. 25, fig. 4 (not figs. 1–3).

The carapace is elongate, sub-rectangular, with nearly straight ventral margin. The anterior outline is almost semi-circular, the posterior one nearly straight. The anterior carina is curved on one specimen, straight on the other. The angle α is 90°, β about 37°. There are about 11 or 12 lirae.

The holotype, Pruvost's figure 8, is 4.2 mm. long and about 2.2 mm. high. The paratype, figure 9, is 4.0 mm. long and about 2.0 mm. high.

The holotype is from the Westphalian, zone A2, at Veille Marihaye, near Liege, Belgium. Named for Charles Barrois, famous for international personal friendships, specialized knowledge of the intricate

structure of coal fields of northeastern France and southwestern Belgium, and his broad knowledge of world-wide geology.

Leaia herriana Guthörl

Leaia herriana Guthörl, Abhandl. der Preuss. Geol. Landesanstalt, n.f., vol. 164, 1934, p. 21, pl. 3, fig. 2, text-fig. 11.

This is a Stephanian species from western Germany which in many respects resembles *Hemicycloleaia tricarinata* and *L. reflexa*. The angle α is, however, small 85°, too small for a typical Stephanian form. The ventral margin is strongly curved and 24 lirae are present on a specimen 5.20 mm. long. The anterior costa is somewhat curved.

Although the outline is intermediate between that of a Leaia and a Hemicycloleaia, the species seems to be a member of the former genus.

Leaia reflexa spec. nov.

Plate 6, fig. 1.

Carapace subrectangular, the outline moderately rounded at the front, gently convex below, and slightly reflexed behind, since the hinge projects a small distance beyond the portion of the shell immediately below it. The first and second carinae are high, the dorsal one faint. The anterior carina is curved, but the angle α is little more than 90°: β is about 30°. Just behind each of the principal carinae the shell is deeply concave. Where crossed by the lirae, the carinae are nodose. The lirae are high, sharp, about 12 in number.

The holotype is 5.25 mm. long and 3.5 mm. high.

This species resembles *Hemicycloleaia tricarinata* (Meek and Worthen), differing chiefly in having fewer and more highly raised lirae and a less curved ventral margin. It is doubtful if poorly preserved specimens could be identified satisfactorily.

Formation and locality: A rare species at various localities in the Wellington formation (Lower Permian) in Noble Co., Oklahoma. The type (MCZ 4711) was found by Dr. G. O. Raasch at a locality in SW ¼ of NW ¼, Sec. 2, T 21 N, R 1 W.

Hemicycloleaia gen. nov.

Leaiadidae with semicircular to subquadrangular outline, the two or three radial ridges rounded or carinate, much reduced in some species. Genotype, *Hemicycloleaia laevis* sp. nov.

Hemicycloleaia leavis spec. nov.

Plate 6, fig. 2

Carapace subquadrangular, anterior margin somewhat rounded, posterior one almost straight. Carinae narrow, slightly elevated. Angle α about 95°, β about 43°. Pseudostriae 11 in number. Length of holotype 7.00 mm., height 5.00 mm. The paratype is 4.00 mm. long and 3.5 mm. high.

This species is remarkable in that the height so nearly equals the length, and for the general smoothness. The specimens are casts of the interior, and show faint undulations along the middle of the valve. It was found by the writer in a shale above the Lower Mahoning sandstone of the Conemaugh series of the Pennsylvanian in a cutting on the abandoned electric line just outside the town of Conemaugh, Penna. The holotype is no. 4795 in the Museum of Comparative Zoölogy, and the paratype is no. 4799.

Hemicycloleaia salteriana (Jones)

Leaia leidyi var. *salteriana* Jones, Palaeontog. Soc., London, 1863, p. 119, pl. 1, fig. 21.

Leaia salteriana Laspeyres, Zeitsch. des Deutsch. Geol. Gesellsellsch., vol. 22, 1870, p. 744, pl. 16, fig. 5;—Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 262, pl. 2, figs. 1–3, text-fig. 2:

Not *Leaia leidyi* var. *salteriana* Bolton, Quart. Jour. Geol. Soc. London, vol. 67, 1911, p, 325, pl. 27, figs. 5, 6.

Not *Leaia salteriana* Stanier, Ann. Soc. Geol. Belgique, vol. 38, 1911, p. 1380.

Pruvost figured a neotype of this species, Jones' original specimens having disappeared. The anterior carina is straight, and the angle α varies from 70° to 76° in various specimens. The species is from the Calciferous sandstone series, Lower Carboniferous, of Fifeshire, Scotland.

Hemicycloleaia trigonoides (Moysey)

Leaia trigonoides Moysey, Geol. Mag., dec. 5, vol. 8, p. 498, fig. 1;—Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 264, text-fig. 3.

The carapace is small, somewhat longer than high, almost semicircular. The anterior carina is straight and the angle α about 90°.

It is from the Westphalian of Derbyshire, England.

Hemicycloleaia minima (Pruvost)

Leaia leidyi Renier (*nec* Lea), Ann. Soc. Geol. Belgique, vol. 34, 1906, p. B 58, vol. 36, p. B 161.

Leaia salteriana Stanier (*nec* Jones), Ann. Soc. Geol. Belgique, vol. 38, 1911, p. B 80.

Leaia tricarinata Pruvost, (*nec* Meek and Worthen), Compte Rendu, 12th Internat. Geol. Congress, Toronto, 1913, pp. 929, 930.

Leaia tricarinata forme *minima* Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 267, pl. 2, figs. 10, 11 (not figs. 8, 9, 12), text-fig. 4,—Terrain Houiller du Nord et du Pas-de-Calais, 1919, p. 67, pl. 25, figs. 1, 2 (not figs. 3, 4), text-fig. 17;—Mus. Royal d'Hist. Nat. de Belgique, Mem. 44, 1930, p. 186.

Pruvost was unable to accept this as a distinct species, but named it chiefly because it was a recognizable small form which occurred over a considerable area low in the Westphalian of northeastern France and southwestern Belgium. The specimens which he considered to be the true *L. tricarinata* were found in the same region only in the upper Westphalian. I am inclined to think that at least three species are included in the *forme minima*, this notion being based on inspection of Pruvost's excellent photographs. Two of these, *Leaia pruvosti* and *Leaia barroisei* have been described on previous pages of this article.

Pruvost designated as "Types" (cotypes) the three specimens shown in his figures 10, 11, and 12, on plate 2. Here we obviously have two species, for figures 10 and 11 represent Hemicycloleaias, whereas figure 12 is that of a Leaia. The specimen shown in figure 11 is the better preserved of the two Hemicycloleaias, and it was doubtless from it that his text-figure 4 was drawn. This figure is labeled "type," which may be interpreted as meaning holotype. I so designate it.

The species, as represented by this specimen is much like *H. tricarinata*, differing in its smaller size, less convex ventral outline, and serrate lirae. It is from the lower Westphalian, zone A2, at Aniche, northeastern France.

Hemicycloleaia ashleyi spec. nov.

Plate 6, fig. 3.

Carapace elongate, rounded both anteriorly and posteriorly, and gently curved on the ventral margin. Anterior carina extremely narrow, so faint as to be overlooked on some specimens; the second is more prominent, but thread-like. The whole surface is convex, with little indication of the concavities present in most species of the Leaia-

didae. The concentric lirae, about 15 in number, are very fine, curved between the first and second carinae, not straight as in Leaia.

This is a distinctive form, but so much like *Monoleiolophus unicostatus*, which occurs in the same layers, that for a time I confused the two. In fact, I am not yet sure whether this species should be referred to the Lioestheriidae or to the Leaiadidae.

The holotype (M.C.Z. 4794) is 5.20 mm. long and 3.00 mm. high.

Horizon and locality: The species has so far been found only in a shale above the Lower Mahoning sandstone of the Conemaugh series of the Pennsylvanian in a cutting along the abandoned electric line just west of Conemaugh, Penna. It is named for Dr. George H. Ashley, long the Director of the Geological Survey of Pennsylvania, a specialist on Palaeozoic coals.

Hemicycloleaia tricarinata (Meek and Worthen)

Plate 6, fig. 4, 5

Leaia tricarinata Meek and Worthen, (*partim*), Geol. Sur. Illinois, vol. 3, 1868, p. 541, text-figs. B 1–3, (not fig. C;) —White, 13th Ann. Rept. Dept. Geol. and Nat. Hist. for 1883, 1884, p. 167, pl. 39, figs. 10–12, not 13. (Figures copied from Meek and Worthen);—Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 265, pl. 2, figs. 4, 5, (not figs. 6, 7).

Not the *Leaia tricarinata* as identified by various European authors.

"Carapace valves moderately convex, . . . the length and height being generally about as 40 to 27, but variable . . . ; anterior outline-rounded, basal margin more or less convex in outline, truncated posterior margin nearly straight . . . lateral carinae or ridges linear, well defined and extending from the beaks at an angle of about 60°, the anterior [posterior] one, which is the longer, straight and extending to the posterior basal margin, and the anterior or shorter one a little curved and passing from the beaks to the anterior basal border; surface marked by about 12 to 16 minute, very slender, regularly disposed, concentric hair-like striae [lirae] running parallel to the basal and anterior and posterior margins.

"Length of a rather large individual, 0.40 inch, height 0.27 inch. . . .

"The specimens represented by cuts B were found . . . in LaSalle county, Illinois, in the lower part of the real Coal Measures [probably Carbondale] and that represented by cut C is from a high position in the Upper Coal Measures of St. Clair County."

The specimen shown in Meek and Worthen's text-figure C is not a *Leaia tricarinata*. It is shorter, and has a straighter posterior margin.

The identification of specimens of *H. tricarinata* raises several problems. On some specimens the anterior carina is straight, on others curved, and the angle α varies from about 90° to about 100°. Figures B_1 and B_2 in Meek and Worthen's paper show a curved anterior carina and the 90° α mentioned above. Professor Stuart Weller sent to Pruvost four specimens from the neighborhood of Georgetown, Illinois, which were pictured by Pruvost on his plate 2, figs. 4 and 5. These show an angle α of about 90° and a curved anterior carina. The strata at Georgetown are of Carbondale age and these are undoubtedly the true *L. tricarinata.* Dr. J. Marvin Weller has loaned me specimens from Taylorsville, Illinois, found in a drill core 18 feet above the No. 5 coal. This would indicate an horizon in the Carbondale series (Westphalian). These specimens are flattened, so that the dorsal carina appears to be marginal. Some have straight, some curved anterior carinae.

Professor Harold W. Scott was good enough to loan me the holotype of *L. tricarinata* (Meek and Worthen's text figures 1, 3). It is beautifully preserved in a pyrite nodule along with various other specimens of the same species. It retains its natural convexity, and shows a narrow, smooth slightly concave flange between the dorsal carina and the hinge. This area is at about right angles to a plane passing between the valves. Meek and Worthen's figure B_3 is an excellent restoration. The specimen is 8 mm. long and 5 mm. high. The anterior carina is slightly curved, the dorsal one high, conspicuous, and somewhat nodose where the concentric lirae cross it. The angle α is about 90°, β is about 35°. There are 22 or 23 fine lirae.

Pruvost was of the opinion that all "Leaias" have dorsal carinae, and that the flange between it and the hinge is concealed by the flattening of most specimens. Under these circumstances, the dorsal carina seems to be the hinge. This is probably true of some species, but there is little or no opportunity to investigate the question with the material now available.

Leaia tricarinata is neither a typical Leaia nor a typical Hemicycloleaia. The outline is more or less intermediate, depending on the state of preservation. There are, however, no specimens in which the ventral outline is not convex, and none in which the course of the lirae between the first and second carinae is straight. It seems best, therefore, to use the present generic name. Pruvost grouped it with the species having suboval valves. Several species exemplify this intermediate stage between the two genera.

All of the specimens which can be definitely identified as belonging to this species are from Illinois and Indiana.

Hemicycloleaia wellerorum spec. nov.

Leaia tricarinata Meek and Worthen (*partim*), Pal. Illinois, vol. 3, 1868, p. 541, text-fig. C (non B_1, B_2).

As Pruvost pointed out, Meek and Worthen's third figured specimen has characteristics which indicate that it is not the true *L. tricarinata*. Why Pruvost referred it to *L. baentschiana* is not obvious, for it is not so high, and the angle α is considerably more obtuse, about 112°. The anterior carina is curved, the specimen is shorter and higher, and has a straigher posterior margin than does *H. tricarinata*.

The type was found at a "high position in the Upper Coal Measures of St. Clair Co., Illinois. The name is for the father and son, Stuart and J. Marvin Weller, who have done so much to elucidate the paleontology and stratigraphy of Illinois.

Hemicycloleaia haynesi spec. nov.

Plate 6, fig. 6

Leaia tricarinata Haynes (*nec* Meek and Worthen), Science, N.S., vol. 37 1913, p. 192, fig. 1.

? *Leaia baentschiania* Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 260 270.

This species differs from *H. tricarinata* chiefly in being shorter and higher and in having the anterior carina straight instead of arcuate. The angle α varies from 90° to 100°, and there are apparently from 16 to 18 lirae, a few less than in the Illinoian species. The umbos are not well preserved, hence the count is not accurate. The angle β varies from 30° to 40°. Some specimens of *H. tricarinata* have a straight anterior carina, although it is curved on the holotype. It is probable that both *H. tricarinata* and *H. haynesi* occur in Illinois, which would explain the apparent variability of Meek and Worthen's species.

Pruvost suggested that Haynes' specimens might belong to *H. baentschiana* (Beyrich), but that species has a much more convex ventral outline.

The holotype of the species (Haynes' figured specimen) is 9.0 mm. long, 5.5 mm. high, α is 100°, β 40°, and there are about 18 lirae. A better preserved specimen from the original locality is 8.00 mm. long, 5.25 mm. high, α is 90°, β 30°, and there are about 16 lirae.

The type locality is Central Falls, near Pawtucket, Rhode Island, and the age Pennsylvanian, probably Conemaugh. The holotype is M.C.Z. No. 4803 and the paratype is M.C.Z. No. 4801.

HEMICYCLOLEAIA NORMALIS spec. nov.

Plate 6, fig. 7

Carapace somewhat semi-oval, the anterior end short, with crowded lirae, the posterior outline slightly reflexed at the hinge. The lirae are fine, rather equally spaced in the median portion of the shell. The angle α is 80°, β 30°, the length 9.50 mm., the height 6.75 mm. Only 12 lirae can be counted, but there are probably more near the beak.

Species of this type are common and it will probably be difficult to distinguish one from another. The present one has an outline similar to that of *Leaia reflexa* from Oklahoma, but α is less than 90°. It differs in the same respect from *H. haynesi*, with which it is associated. On the other hand, *H. acutangularis* from the same locality has an angle α 20° lower, and is a much more elongate form. It seems most closely allied to *H. salteriana* (Jones), but has a shorter anterior portion with more crowded lirae.

The holotype (M.C.Z., 4804), was collected by W. P. Haynes from the Mid-Pennsylvanian strata at Central Falls, near Pawtucket, Rhode Island.

HEMICYCLOLEAIA ACUTANGULARIS spec. nov.

Fig. 6. *Hemicycloleaia acutangularis* Raymond. Holotype. x 4.

Carapace elongate, rounded anteriorly and below, slightly reflexed posteriorly. The concentric lirae are so slender and ill preserved that it is impossible to count them. The angle α is 60°, β about 23°. The length of the holotype is 9.00 mm., and the height 5.25 mm.

The chief characteristic of the species, and the one which suggested the name, is the acuteness of the angles α and β. In this respect it differs from all other known Leaiadidae. The holotype and only known specimen shows the third, marginal carina, despite its flattened condition. The shape may be abnormal, because of longitudinal stretching, but this does not seem probable, for two specimens of *H. haynesi* on the same fragment of shale have their normal proportions.

The holotype (M.C.Z. No. 4802) is from the Mid-Pennsylvanian at Central Falls, near Pawtucket, Rhode Island, and was collected by Winthrop P. Haynes.

Hemicycloleaia boltoni spec. nov.

Leaia tricarinata Pruvost (*nec* Meek and Worthen), Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 265, pl. 2, figs. 6, 7.

Bolton sent to Pruvost two specimens which were found in the Westphalian near Bristol, England. Pruvost figured them as *Leaia tricarinata*, and considered them to be the same species which Bolton had described as *Leaia leidyi* var. *salteriana*. It is, however, obvious from Pruvost's excellent photograph, that although this is a Hemicycloleaia, it is not *H. tricarinata*, and that it is not the same as the form which Bolton figures as *Leaia leidyi* var. *salteriana*, which is described on a previous page as *Leaia bristolensis*.

H. boltoni is like *H. tricarinata* in shape, and in having an angle α of about 90°, but has fewer and more widely spaced lirae.

Pruvost's best specimen (his pl. 2, fig. 7) which I designate as the holotype, is about 7 mm. long, 5 mm. high, and has 12, or possibly a few more lirae.

Hemicycloleaia baentschiana (Beyrich)

Leaia leidyi var. *baentschiana* Beyrich, Zeitschr. der Deutsch. Geol. Gesells., vol. 16, 1864, p. 363;—Goldenberg. Fauna Saraep. foss., vol. 1, 1873, p. 29, pl. 1, figs. 20, 21; *ibid.* vol. 2, p. 46, pl. 2, fig. 24.

Leaia baentschiana Laspeyres, Zeitsch. der Deutsch. Geol. Gesells., vol. 22, 1870, p. 744, pl. 16, fig. 2.;—Leppa, Geol. Skizze der Sarbr. Steinkohl, 1904, p. 35, figs. 2–5;—Pruvost, Ann. Soc. Geol. du Nord., vol. 43, 1914, p. 270, text-fig. 7;—Guthröl, Abhandl. der Preus. Geol. Landsanst., vol. 164, 1934, p. 17, pl. 2, fig. 5, pl. 3, fig. 1, text-fig. 9.

Leaia beanschi Waterlot (*partim*), Etude de la faune cont. du Terrain Houiller Sarro-Lorrain, 1934, p. 47, pl. 7, figs. 1–9, text-figs. 6A, B.

This species is either highly variable, or else there has been considerable latitude in the identification. According to Waterlot the angle α is 100° and the anterior rib may be either straight or curved. Many of the specimens show a strong dorsal carina. Some resemble *H. tricarinata* (Meek and Worthen), but the typical outline is strikingly different. It is found in the Stephanian in the Saar coal basin in Germany.

Hemicycloleaia wettinensis (Laspeyres)

Leaia wettinensis Laspeyres, Zeitschr. d. Deutsch. Geol. Gesells., vol. 22, 1870, p. 744, pl. 16, fig. 1;—Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 274.

This remarkable species, from the Stephanian at Wettin, Saxony, has the largest carapace of any known member of the Leaiadidae, the length being 15 mm., height, 11 mm. The carinae are present only on the umbo. According to Laspeyres, the angle α is 110° and β about 65°.

The loss of the carinae in this form, and their beginnings in *L. laevicosta* of the Mississippian make it appear almost as if Leaia arose from some simple Pseudestherian such as *P. leaiaformis,* that the group ran its course, and reverted to a Pseudestheria again in the next stage after *Hemicycloleaia wettinensis.* Have we here an example of speciation by saltation? Experimental work seems to show that after a certain number of generations the mutants tend to return to the form of the original stock from which they were derived. Pruvost spoke of this species as "senile" and noted its resemblance to "Estheria."

Praeleaia Lutkevich

Bull. Com. Geol., Leningrad, vol. 48, 1929, p. 723, 729.

Leaiadidae with four or five radial ridges, but without one on the dorsal margin. Genotype, (here selected), *P. quadricarinata* Lutkevich.

In some respects, this genus resembles Estheriella, but the similarity is probably superficial. One of the important features of the Leaiadidae is the fact that the areas between the radial carinae are distinctly concave, which is not true of Estheriella. Moreover, the prominent radial ridges of Estheriella are grouped in the median portion of the carapace, whereas in the Leaiadidae, all are equally prominent. Middle Devonian.

Praeleaia quadricarinata Lutkevich

Praeleaia quadricarinata Lutkevitch, Bull. Com Geol., Leningrad, vol. 48, 1929, p. 724, 740, pl. 36, figs. 17a, b, 18a, b, 19a, b.

This species has four radial carinae, the first at a right angle to the hinge, or projecting a little forward. All the carinae reach the margin, and are nearly equally spaced. There are from 15 to 18 lines of growth. The specimens are from Middle Devonian marls near the junction of the Ruia and Pliusa rivers in Esthonia.

Praeleaia quinquecarinata Lutkevich

Praeleaia quinquecarinata Lutkevich, Bull. Com. Geol., Leningrad, vol. 48, 1929, p. 726, 731, pl. 36, figs. 2Da-d, 21a, b.

This species differs from *P. quadricarinata* in being more elongate and in having five carinae on each valve of the caracace. It is from the same locality.

Paraleaia gen. nov.

Leaiaidae with two carinae in addition to the dorsal one, the angle α obtuse. Between the carinae, and in front of the anterior one, are narrow radial grooves, which in some cases extend to the margin, in others are short. Genotype, *Leaia klieveri* Goldenberg.

As will be seen by the synonymy of the genotype, this form has been the subject of considerable discussion and difference of opinion. Goldenberg found it in the same beds as *Leaia baentschiana* Beyrich, and considered it as closely allied to that species, possibly a sexual dimorph. Pruvost adopted this view, in which he was followed, but somewhat cautiously, by Waterlot. The latter has given the best description. I agree, however, with Guthörl, that there is no real evidence for this view, and consider the radial furrows as distinctive features. Their arrangement seems to me to indicate that they are not due to compression, a possibility discussed by Waterlot.

Paraleaia klieveri (Goldenberg)

Leaia leidyi var. *klieveri* Goldenberg, Fauna Saraep. pt. 1, 1873, p. 24, pl. 1, fig. 22.

Leaia klieveriana Goldenberg. Fauna Saraepr. pt. 2, 1877, p. 46, pl. 2, figs. 20, 21;—Pruvost, Ann. Soc. Geol. du Nord, vol. 43, 1914, p. 273;—Guthörl., Abh. der Preus. Geol. Landsans., vol. 164, p. 19, pl. 2, fig. 6, text-fig. 10.

Leaia baentschiana Pruvost (*partim*), Compt. Rendu, 13th Int. Geol. Congress, Belgium, fasc. 2, 1922, p. 649.

Leaia baentschiana forma *klieveri* Waterlot, Etude de la Faune Cont. du Terrain Houiller Sarro-Lorraine, 1934, p. 50, pl. 7, figs. 1K, 10, 11.

This species is rather variable, not only in the number and length of the radial furrows but in the outline of the carapace. Waterlot gives the value for α as 105° to 108°, and that of β as 30° to 57°. The specimens are found in the Stephanian of the Saarbrücken area, western Germany.

SUMMARY ON THE LEAIADIDAE

As remarked on the page on which this family was described, it seems probable that Leaia-like animals arose at various times from various ancestors. It does not seem at all probable that Praeleaia is the ancestor of any of the later members of the group. It is more likely that it is in some way connected with Estheriella.

The present indications are that Leaia and Hemicycloleaia originated in Mississippian times from some pseudestherian stock, for there seems to be a transition from *Pseudestheria leaiaformis* through *Leaia laevicostata* to the typical Leaia with sharp carinae. The transition from the true Leaia to Hemicycloleaia is seen in so many species that it appears possible that the more oval forms were repeatedly evolved from the subrectangular ones.

Further collecting in the Mississippian of Nova Scotia will probably bring important evidence on the origin of Leaia. As Dr. Bell wrote me when sending the specimens, "It seems as though they are all Estherias turning into Leaias."

A third element in the picture is presented by *Hemicycloleaia ashleyi*. It is a question whether this species should be included in the family. Its only claim for admission is its possession of two sharp carinae, for it lacks the family characteristic of a depressed area between these ridges. It is obviously related to *Monoleiolophus unicostatus*, and should perhaps be placed in the Lioestheriidae rather than in the Leaiadidae. No other species of the same type has been found.

It has been shown in this study that the value of the angle α must be used with caution in determining the age of the strata in which the specimens are found. Not all the species with an angle less than 90° are Dinantian, nor are all those with an α of more than 90° Stephanian or Permian.

ALPHABETICAL LIST

An alphabetical list of the species of the Cyzicidae, Lioestheriidae, Lynceidae, Limnadiidae, and Cyclestheriidae mentioned in this paper follows. The specific name is followed by that of the genus under which it has been known, and this by the describer of the species. Following the sign of equality is the name of the genus to which the present writer would ascribe the species.

adamsi, Estheria, Jones = Erisopsis
alta, Pseudestheria, Raymond = Pseudestheria
amurensis, Estheria, Chernyshev (partim) = Orthothemos
amurensis, Estheria, Chernyshev (partim) = Bairdestheria
amurensis, Estheria, Chernyshev (partim) = *Orthothemos ovalis*
amurensis, Estheria, Chernyshev (partim) = *Limnadopsis sibericensis*
andrewsi, Estheria, Jones = ? Palaeestheria
anomala, Estheria, Jones = Palaeestheria
ardra, Limnestheria, Wright = Limnestheria
aricensis, Estheria, Jones = ? Dadaydedeesia
astardoides, Estherina, Jones = Estherina
autunensis, Euestheria, Raymond = Euestheria
belli, Erisopsis, Raymond = Erisopsis
belmontensis, Estheria, Mitchell = Pseudestheria
blackstonensis, Pseudestheria, Raymond = Pseudestheria
bresiliensis, Estherina, Jones = Estherina
brevis, Pseudestheria, Raymond = Pseudestheria
buchoti, Estheria, Peneau = Rhabdostichus
carpenteri, Palaeolimnadiopsis, Raymond = Palaeolimnadiopsis
cebennensis, Estheria, Grand'Eury = Pseudestheria
chernyshevi, Pemphicyclus, Raymond = Pemphicyclus
chilensis, Estheria, Phillipi = ? Limnadopsis
clarkei, Asmussia, Raymond = Asmussia
coghlani, Estheria, Etheridge, Jr. = Palaeolimnadia
costata, Estheria, Weiss = Dadaydedeesia
crassa, Estheria, Lutkevich = Lioestheria
dahurica, Estheria, Chernyshev = ? Bairdestheria
daja, Estheria, Chernyshev = Bairdestheria
dawsoni, Estheria, Jones = Pseudestheria
dawsoni, Estheria, Packard, not a conchostracan
densicostata, Estheriella, Chernyshev = ? Anomalonema
diensti, Estheria, Gross (partim) = Pseudestheria
diensti, Estheria, Gross (partim) = *Palaeolimnadiopsis* ? *eifelensis*
draperi, Estheria, Jones and Woodward = Orthothemos
drumni, Estheria, Guthörl = Pseudestheria
elongata, Estheria, Chernyshev = Pseudestheria
emmonsi, Pseudestheria, Raymond = Pseudestheria
eifelensis, Palaeolimnadiopsis ? Raymond = ? Palaeolimnadiopsis
exigua, Estheria, Eichwald = Euestheria
expansa, Estherina, Jones = Estherina
forbesii, Estheria, Jones = Euestheria
faveolata, Estheria, Chernyshev = ? Pseudestheria
freysteini, Estheria, Geinitz = ?
frikiensis, Estheria, Grabau = Pseudestheria
geinitzii, Estheria, Jones and Woodward = Pseudestheria

geinitzii, grebeana, Estheria, Jones and Woodward = *Pseudestheria grebeana*
glabra, Estheria, Mitchell = Palaeolimnadia
glenleensis, Estheria, Mitchell = Palaeolimnadia
greyi, Estheria, Jones = Palaeolimnadia
heckeri, Estheria, Chernyshev = Pseudestheria
hindei, Estheria, Jones = Pseudestheria
inornata, Lioestheria, Raymond = Lioestheria
intermedia, Estheria, Chi = Bairdestheria
ipsviciensis, Estheria, Mitchell = Pseudestheria
jonesi, Palaeolimnadiopsis, Raymond = Palaeolimnadiopsis
kansuensis, Estheria, Chi = Bairdestheria
karpinskiana, Estheria, Jones = ? Bairdestheria
kotahensis, Estheria, Jones = Bairdestheria
kryshtofovichi, Estheria, Chernyshev = ? Pseudestheria
lallyensis, Estheria, Depéret and Mazeran = Lioestheria
laminatus, Pemphicyclus, Raymond = Pemphicyclus
lata, Estheria, Mitchell = Pseudestheria
laxitecta, Estheria, Jones = Euestheria
laxitecta, Estheria, Sandberger = *Euestheria laxitecta*
leaiaformis, Pseudestheria, Raymond = Pseudestheria
lenticularis, Estheria, Mitchell = Cyclestherioides
lewisii, Estheria, Jones = Pseudestheria
limbata, Estheria, Goldenberg = Pseudestheria
linguiformis, Estheria, Mitchell = ? Palaeolimnadia
lualabensis, Estheria, Lariche = Estheriella
mangaliensis, Estheria, Jones = Euestheria
mangaliensis pennsylvanicus, Estheria, Wanner = *Pseudestheria pennsylvanica*
mathieui, Estheria, Pruvost = Lioestheria
mawsoni, Estheria, Jones = Bairdestheria
membranacea, Estheria, *auct.* = Asmussia
membranacea, Asmussia, Pacht = Asmussia
middendorfii, Estheria, Jones = Bairdestheria
minuta, Estheria, von Zieten = Euestheria
minuta brodieana, Estheria, Jones = *Euestheria brodieana*
minuta karpinskiana, Estheria, Jones = ? *Bairdestheria karpinskiana*
molesta, Pseudestheria, Raymond = Pseudestheria
multicostata, Estheria, Emmons = Pseudestheria
multilineata, Estheria, Jones = Dadaydedeesia
multistriata, Estheria, Reed = Orthothemos
murchisoniana, Estheria, Jones = Asmussia
murchisoniae, Estheria, Jones = Bairdestheria
nengkiangensis, Estheria, Chi = Bairdestheria
neotropica, Estheria, Reed = Orthothemos
nodosocostata, Estheria, Giebel = Estheriella
novacastrensis, Estheria, Mitchell = Pseudestheria

obenaueri, Estheria, Guthörl = Pseudestheria
obliqua, Estheria, Mitchell = ? Pseudestheria
oblonga, Estheria, Kratow = Dadaydedeesia
orientalis, Eichwald = *Bairdestheria middendorfii*
ortoni, Estheria, Clarke = Pemphicyclus
ovalis, Estheria, Emmons = ?
ovalis, Orthothemos, Raymond = Orthothemos
ovata, Estheria, Jones (partim) nec Lea = *Pseudestheria emmonsi*
ovata, Estheria, Jones (partim) nec Lea = *Lioestheria inornata*
ovata, Posidonia, Lea = Pseudestheria
peachi, Estheria, Jones = Pseudestheria
plicata, Estheria, Lutkevich = Pseudestheria
plicifera, Pseudestheria, Raymond = Pseudestheria
posidomyoides, Estheria, Chernyshev = Bairdestheria
progrebovi, Estheria, Lutkevich = Asmussia
pruvosti, Palaeolimnadiopsis, Raymond = Palaeolimnadiopsis
pulex, Estheria, Clarke = Rhabdostichus
raaschi, Lioestheria, Raymond = Lioestheria
radiata, Estheria, Salinas = Dadydedeesia
raricostata, Estheriella, Chernyshev = ? Anomalonema
regularis, Estheria, Reed = Orthothemos
remauxi, Estheriella, Pruvost = Anomalonema
reinachii, Estheria, Jones and Woodward = Palaeolimnadiopsis
reticulata, Estheria, Chernyshev = ? Bairdestheria
rimosa, Estheria, Goldenberg = Pseudestheria
rugosa, Pseudestheria, Raymond = Pseudestheria
sibericensis, Limnadopsis, Raymond = Limnadopsis
simoni, Estheria, Pruvost = Pseudestheria
sinensis, Estheria, Chi = Bairdestheria
sinkiangensis, Estheria, Chi = Bairdestheria
sinuata, Estheria ?, Lutkevich = *Asmussia progrebovi*
stchukini, Lynceus (Limnetis), Chernyshev = Lynceus
stockmansi, Estheria, Mailleux = ? Euestheria
stowiana, Estheria, Jones = *Orthothemos draperi*
striata, Estheria, Goldfuss and Münster = Lioestheria
striata muensteriana, Estheria, Jones and Woodward = *Palaeolimnadiopsis muensteriana*
striata tenuipectoralis, Estheria, Jones = ? *Palaeolimnadiopsis tenuipectoralis*
subcircularis, Pseudestheria, Raymond = Pseudestheria
subquadrata, Estheria, Sowerby = Bairdestheria
subulata, Estheria, Reed = Palaeolimnadiopsis
tegulata, Estheria, Jones = Dadydedeesia
tenella, Estheria, Bronn = Pseudestheria
tenuipectoralis, Estheria, Jones = ? Palaeolimnadiopsis
tessellata, Estheria, Jones = Erisopsis

transbaikalica, Estheria, Chernyshev = Bairdestheria
trapezoidalis, Estheria, Kratow = Dadaydedeesia
trigonellaris, Estheria, Mitchell = Pseudestheria
unicostatus, Monoleiolophus, Raymond = Monoleiolophus
wianamattensis, Estheria, Mitchell = Palaeolimnadia
youngi, Estheria, Jones = Pseudestheria

SYNOPTIC TABLE OF THE GENERA OF FOSSIL CONCHOSTRACA

It will probably assist in understanding the classification here adopted, and also help in the identification of fossils, to bring together brief characterizations of the various families and genera.

Family CYZICIDAE Stebbing

Shell thin, laterally compressed, with numerous distinct growth-lines, and in some, other surface sculpturing. Mesozoic to Recent.

Bairdestheria Raymond

Cyzicidae with irregular radial striations and lirae in the intervales between growth-lines or costellae. Jurassic to Recent.

Family LIOESTHERIIDAE Raymond

Conchostraca with numerous concentric costellae or costae, and, in rare instances, radial or polygonal sculpture. Devonian to Cretaceous.

Lioestheria Depéret and Mazeran

Lioestheriidae with surface of carapace covered with close-set costellae, with extremely narrow intervales. Devonian to Triassic.

Erisopsis Raymond

Lioestheriidae with numerous concentric costellae, the axis of the carapace markedly oblique to the hinge. Carboniferous.

Asmussia Pacht

Lioestheriidae with straight hinge, subcentral beak, and reticulate sculpture in the intervales. Devonian.

ORTHOTHEMOS Raymond

Lioestheriidae like Asmussia, but without reticulate sculpture. Permian ? to Cretaceous.

EUESTHERIA Depéret and Mazeran

Lioestheriidae with oval form, anterior beak, concentric lirae or costellae, and reticulate sculpture in the intervales. Devonian ? to Triassic.

PSEUDESTHERIA Raymond

Lioestheriidae with carapaces of various forms. The intervales between the lirae, costellae, or costae are punctate. Devonian to Triassic.

PALAESTHERIA Barnard

Lioestheriidae with a large smooth umbonal region. Costellae numerous, with punctate intervales. Lower Cretaceous.

ESTHERIELLA Weiss

Lioestheriidae with radial costae crossed by concentric costellae or lirae. Triassic.

DADAYDEDEESIA Raymond

Lioestheriidae with radial lirae crossing the whole or part of the carapace. Westphalian to Triassic.

MONOLEIOLOPHUS Raymond

Lioestheriidae with a single diagonally directed radial ridge. Westphalian.

Family LYNCEIDAE Stebbing

Conchostraca without growth lines on the carapace. Jurassic to Recent.

LYNCEUS Müller

Not definable on the basis of the carapace alone. Jurassic to Recent.

Family LIMNADIIDAE Sars

Carapace with relatively few growth-lines, and, in most genera, a large smooth umbo. Devonian to Recent.

Palaeolimnadia Raymond

Limnadiidae with smooth umbo, few growth-lines, and no externally visible muscle-scar. Permian to Triassic.

Pemphicyclus Raymond

Limnadiidae with an umbonal tubercle, at least in the young. Westphalian to Permian.

Estherina Jones

Limnadiidae with a swollen circum-umbonal region abruptly separated from a less convex ventral area. Cretaceous ?

Limnestheria Wright

Limnadiidae with one instead of two pairs of claspers. Westphalian.

Limnadopsis Spencer and Hall

Limnadiidae with straight, serrate hinge and growth-lines which turn backward close to the dorsal margin. Cretaceous to Recent.

Palaeolimnadiopsis Raymond

Limnadiidae similar to Limnadopsis, but without serrations on the hinge. Devonian ? to Permian.

Anomalonema Raymond

Limnadiidae with a carapace like that of Palaeolimnadiopsis, but with discontinuous radial lirae. Westphalian.

Family CYCLESTHERIIDAE Sars

Carapace almost circular, with few growth-lines. Triassic to Recent.

Cyclestherioides Raymond

Cyclestheriidae in which the beaks are not quite so far forward as in Cyclestheria. Triassic.

Family unknown

Rhabdostichus Raymond

Carapace with concentric undulations separated by incised growth-lines. Beak subcentral, hinge curved. Silurian ? to Devonian.

Family LEAIADIDAE Raymond

Conchostraca with two or more widely divergent radial carinae or ridges, between which are concave areas. The concentric markings are lirae. Devonian to Permian.

Leaia Jones

Leaiadidae with two or three radial carinae or ridges and a nearly straight ventral outline. Dinantian to Permian.

Hemicycloleaia Raymond

Leaiadidae with semicircular to subquadrate outline, with two or three radial ridges, rounded or carinate, much reduced in some species. Dinantian to Westphalian.

Praeleaia Lutkevich

Leaiadidae with five or six radial ridges. Middle Devonian.

Paraleaia Raymond

Leaiadidae with radial grooves in addition to the three radial carinae. Stephanian.

CAMBRIAN CONCHOSTRACA

Ulrich and Bassler have published a monograph on the "Cambrian Bivalved Crustacea of the Order Conchostraca," Proc. U.S. Nat. Mus., vol. 78, 1931, pp. 1–130, pls. 1–10. The specimens they described are undoubtedly bivalved Crustacea, but it is a question whether any of them are Conchostraca. Most of the species are arranged in three families, the Bradoriidae Matthew, the Beyrichonidae Ulrich and Bassler, and the Indianidae Ulrich and Bassler. A few were assigned to the Limnadiidae Baird. All members of the first three families are small, ostracod-like, but differ from true ostracods in having a less calcareous shell. Most of them seem to have an anterior rather than median muscle scar and the valves seem to be united at the hinge. The differences from the Conchostraca are even more marked than those in which they fail to reach the requirements for the Ostracoda. Many show an ocular tubercle, which is unknown in the Conchostraca, and none of them shows lines of growth. It is true that this latter feature is a characteristic of the Lynceidae, but it is a far cry from the Cambrian to the first appearance of the true Lynceidae in the Mesozoic. The Bradoriidae have an ocular tubercle, the Beyrichonidae have various ridges and nodes, unlike anything known in the Conchostraca. The Indianidae are somewhat more conchostracan-like, but lack growth-lines and have a decidedly ostracodan habitus. The writer has already commented on this group[1] and offered for them the ordinal name Bradorina, with the suggestion that they were probably the ancestors of the Ostracoda.

Some of the species which Ulrich and Bassler referred to the Limnadiidae may be conchostracans. *Leperditta curta* Matthew, which is not the genotype, and *Fordilla troyensis* Barrande (incidentally Fordilla is Barrande's genus, not Walcott's) both show growth-lines, and, technically, I do not see any way of excluding them from the Lioestheriidae. Possibly they are ancestors of the Conchostraca, but until Upper Cambrian, Ordovician, Silurian, and Lower Devonian connecting links are found it is probably wise to leave them in their present uncertain position.

GEOLOGIC AND GEOGRAPHIC DISTRIBUTION

This preliminary survey indicates that the Conchostraca can be made to serve a useful purpose in the correlation of fresh-water de-

[1] Bull. Mus. Comp. Zoölogy, vol. 76, 1935, p. 220, 228.

posits, strata which in general are devoid of easily identified invertebrate fossils. The writer does not pretend to have reached final conclusions about anything. He will be satisfied if he has stirred up interest in the group. Many paleontologists in many lands will have to study the species more carefully before their real significance can be ascertained.

A few things seem to stand out rather clearly. A modern genus, Bairdestheria, appeared as early as the Jurassic, and with the exception of one species in South America, seems to have been Eurasian, extending from Scotland to China. Another modern genus, Limnadopsis, appeared in the Cretaceous of Siberia, and is perhaps represented in South America. Lynceus is, curiously enough, reported from the Jurassic of Siberia, making a total of three modern genera which have fossil species. Cyclestherioides, from the Triassic of Australia is so like the recent Cyclestheria that some may feel that it is a synonym of that genus. Another Triassic Australian genus, Palaeolimnadia also gives a foretaste of the modern conchostracon fauna. It appeared as early as the Permian, and is South African as well as Australian.

Some of the Paleozoic genera have species which persist into the Triassic, but none into the Jurassic, so there is no great overlap of the really ancient and modern faunas. The age of the oldest conchostracean can not be definitely stated. Pineau thought that the French *Rhabdostichus buchoti* was Silurian, but it may well be Middle Devonian. *R. pulex* Clarke is certainly Middle Devonian. Lioestheria and Asmussia have been reported from the Middle Devonian of Esthonia, Euestheria and Pseudestheria from the Lower Devonian of Belgium and the Eifel district of Germany respectively. The writer is not familiar with the Devonian sequence in either Esthonia or the Belgian-German region, but has considerable confidence that the ages as given are correct. Asmussia is found in the Middle Devonian of New York, and the Upper Devonian of Livonia and Scotland. It appears to be a good Devonian index fossil. The evidence, so far as it goes, seems to indicate that the real conchostracans descended from some of the bivalved crustaceans of the Cambrian and Ordovician, and like so many other animals, got into fresh waters in late Silurian or early Devonian times. The genus Rhabdostichus appears to have remained in the original marine environment.

Lioestheria has a long range, Middle Devonian to Triassic, and but few species. As a genus it probably will not be of much use, but individual species may be important, as seems to be the case in the Carboniferous in France, Belgium and Germany. The general range is

north European, but a species is known from China, and two from the United States.

Erisopsis is another unimportant genus, being known only from the Carboniferous of Great Britain and Nova Scotia. Limnestheria, although zoölogically most interesting, is not identifiable on the basis of the carapace.

Pseudestheria can probably be made more useful by more careful study. As here used, it includes a great many species, most of which have few distinctive characteristics. The range is from the Lower Devonian to the Triassic. In North America most of the described species are from the Permian and Triassic, although there are three in the Mississippian. There is reason to believe that there are many undescribed forms in the Pennsylvanian. The oldest species are two from the Lower Devonian of Germany, and the Mid-Devonian of Esthonia has produced one. There are two species in the Dinantian of Scotland and three in strata of about the same age in Nova Scotia. Three species are known from the Westphalian of England, France, Germany and Russia, one of them, *P. simoni* Pruvost, being reported from all four countries. Only two species are known from the Stephanian, both from Germany. A single Carboniferous ? form is known from South America. The greatest abundance of the genus is in the Permian and Triassic. Two species are now known from Oklahoma and Kansas, six from Germany, one of them being found also in France, one from China, and five from Australia. All of these are Permian. From the Triassic we have four species in eastern United States, three in Siberia, and one in Australia.

Dadaydedeesia ranges from the Westphalian to the Triassic. There is one species from the Westphalian of Scotland and possibly one in the Carboniferous of Peru. Two are known from the Permo-Carboniferous of Russia, and two from the Triassic, one of them in Sicily, the other from the Malay region.

If *E.*? *stockmansi* (Mailleux) really belongs to Euestheria, this genus has as long a range as Pseudestheria. Although there are few species, they are widely distributed and definitely identifiable, hence it is an important genus. Curiously enough it has not yet been recognized in North America. So far, there is one doubtful species from the Lower Devonian of Belgium, one each from the Permian of France and Russia, three from the Triassic of the general region of Great Britain, France, and Germany, and one which has been reported from the Triassic of India and South America. Another South American species is of unknown age.

Palaeolimnadiopsis is another genus which bids fair to be important in correlation because of its wide distribution, and now that its characteristics have been pointed out, ease of identification. The geological range is definitely Dinantian to Permian, the one Lower Devonian species from Germany being only provisionally assigned to this genus. Two species are known from the Lower Carboniferous, one each in Siberia and Scotland. Another ranges from France and Belgium to Russia in the Westphalian, and two species are known from the Permian, one from Oklahoma and the other from South America.

A related genus, Anomalonema, is, so far as known, restricted to the Westphalian of France and Russia.

The curious Pemphicyclus has a widespread distribution, but so far, only three species. Two of these are Westphalian, one in Ohio and one in Russia. The third is from the Permian of Oklahoma. Monoleiolophus is known from the Westphalian of Pennsylvania only.

I took up first the genera which are represented in the present-day fauna, then those which range from the upper Paleozoic into the Triassic. We may now turn our attention to the genera confined to the Mesozoic. No one of these has yet been found in North America.

Estheriella is confined to the Triassic of Germany and the Belgian Congo. It is easily identifiable and useful.

Orthothemos may be represented in the Permian, for there are three species in Brazil which are recorded as "Permian or Triassic." I am inclined to think that the beds are of the latter age. There is one species from the Triassic of South Africa, and one from the Upper Cretaceous of Siberia.

Estheriina is confined to strata supposed to be of Cretaceous age in Brazil, and Palaeestheria is found in the Lower Cretaceous of South Africa, and possibly in England.

PLATES

PLATE 1

PLATE 1

Fig. 1. *Bairdestheria donaciformis* (Baird). Genotype. From Baird. Size not indicated in original publication. Probably x 3/4.

Fig. 2. The same species. Greatly enlarged drawing to show details of sculpture. From Baird.

Fig. 3. *Lioestheria lallyensis* Depéret and Mazeran. Genotype. From Depéret and Mazeran. x 3.75.

Fig. 4. *Lioestheria raashi* Raymond. The holotype. M.C.Z. No. 4781. x 12.4.

Fig. 5. The same species. A slab giving an indication of the abundance. M.C.Z. No. 4807. x 1.

Fig. 6. *Erisopsis belli* Raymond. The holotype. Geol. Sur. Canada, No. 7570. x 9.

Figs. 7, 8, 9. *Erisopsis tessellata* (Jones). From Jones. x 5.

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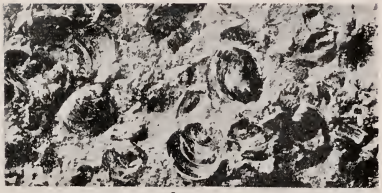

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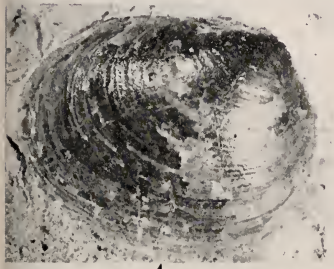

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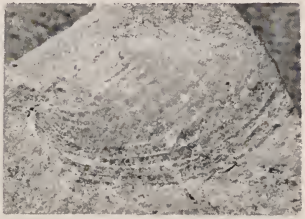

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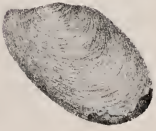

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PLATE 2

PLATE 2

Fig. 1. *Asmussia membranacea* Pacht. Genotype. A specimen from Livonia. From Jones. x 5.4.

Fig. 2. *Asmussia murchisonana* (Jones). From Jones. x 3.4.

Figs. 3, 4. *Asmussia clarkei* Raymond. From Clarke. x 5.4.

Fig. 5. *Orthothemos draperi* (Jones and Woodward). Genotype. From Jones and Woodward. x 1.45.

Fig. 6. The same species. A portion of the surface, greatly enlarged. From Jones and Woodward.

Fig. 7. *Euestheria minuta* (von Zieten). Genotype. An English specimen. From Jones. x 5.

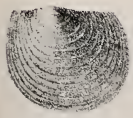
Fig. 8. The same species. A portion of the surface, greatly enlarged. From Jones.

Fig. 9. *Pseudestheria brevis* Raymond. Paratype. M.C.Z. No. 4790. x 12.

Fig. 10. The same species. Holotype. M.C.Z. No. 4798. x 13.

Fig. 11. *Euestheria autunensis* Raymond. From Depéret and Mazeran. x 4.

Fig. 12. *Pseudestheria plicifera* Raymond. Holotype. M.C.Z. No. 4791. x 9.



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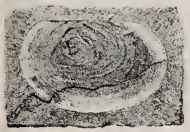

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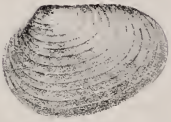

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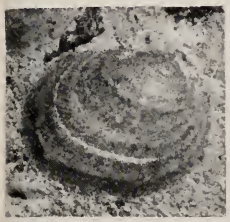

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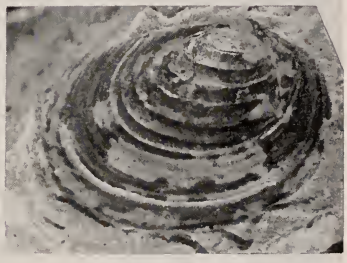

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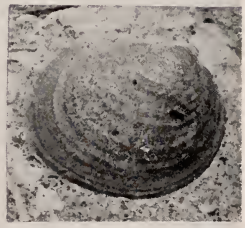

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PLATE 3

PLATE 3

Fig. 1. *Pseudestheria blackstonensis* Raymond. Holotype. M.C.Z. No. 4800. x 7.7.

Fig. 2. *Pseudestheria rugosa* Raymond. Holotype. M.C.Z. No. 4806. x 6.75.

Fig. 3. *Palaeestheria anomala* (Jones). Genotype. From Jones. x 5.25.

Fig. 4. *Estheriella nodosocostata* (Giebel). Genotype. From Jones. x 6.

Fig. 5. The same species. From Jones. x 6.

Fig. 6. *Estheriella lualabensis* Lariche. A reconstruction. From Lariche. x 9.

Fig. 7. *Palaeolimnadia wianamattensis* (Mitchell). Genotype. From Mitchell. x 8.25.

Fig. 8. The same species. From Mitchell. x 9.75.

Fig. 9. *Dadaydedeesia multilineata* (Jones). Genotype. From Jones. x about 6.

Fig. 10. The same species. A portion of the shell, greatly enlarged. From Jones.

Fig. 11. *Monoleiolophus unicostatus* Raymond. Holotype. M.C.Z. No. 4792. x 7.5.

Fig. 12. *Pemphicyclus laminatus* Raymond. Holotype. M.C.Z. No. 4782. x 7 1/3.

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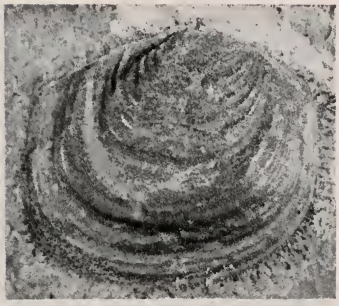

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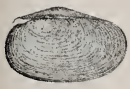

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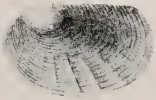

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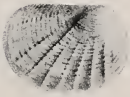

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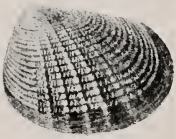

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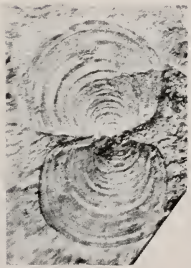

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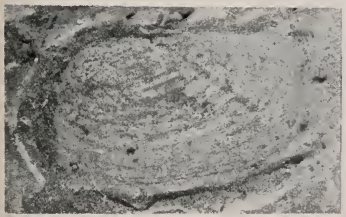

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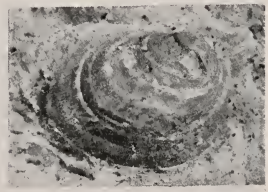

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PLATE 4

PLATE 4

Fig. 1. *Pemphicyclus laminatus* Raymond. A paratype. M.C.Z. No. 4783. x 12.

Fig. 2. The same species. Another paratype. M.C.Z. No. 4783. x 12.

Fig. 3. *Pemphicyclus ortoni* (Clarke). A young individual. From Clarke. x 12.

Fig. 4. The same species. A somewhat larger individual. From Clarke. x 6.

Fig. 5. *Estheriina bresiliensis* Jones. Genotype. From Jones. x 4.

Fig. 6. The same species. A fragment of the surface. Greatly enlarged. From Jones.

Fig. 7. *Palaeolimnadiopsis carpenteri* Raymond. Paratype. M.C.Z. No. 4789. x about 3.

Fig. 8. The same species. Holotype. The largest known specimen of a conchostracan. M.C.Z. No. 4705. x 2.65.

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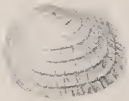

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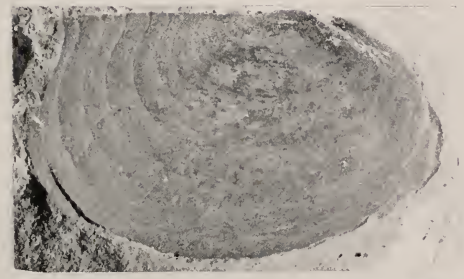

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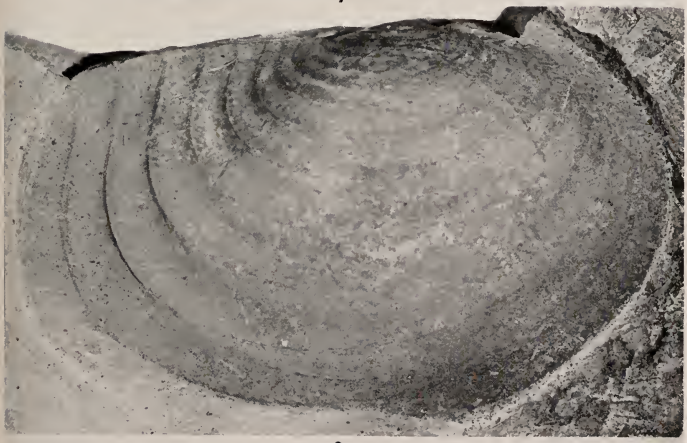

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PLATE 5

PLATE 5

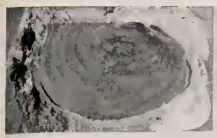
Fig. 1. *Palaeolimnadiopsis carpenteri* Raymond. A paratype. M.C.Z. No. 4789. Slightly enlarged.

Fig. 2. The same species. Holotype. M.C.Z. No. 4705. x 1.

Fig. 3. *Cyclestherioides lenticularis* (Mitchell). Genotype. From Mitchell. x 9.

Fig. 4. *Rhabdostichus pulex* Clarke. Genotype. From Hall and Clarke. x about 48.

Fig. 5. *"Estheria dawsoni"* Packard. Holotype. Probably the scale of a large Mallotus. Peter Redpath Museum, McGill Univ. No. 6353. x 8.2.



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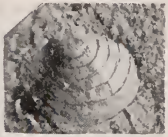

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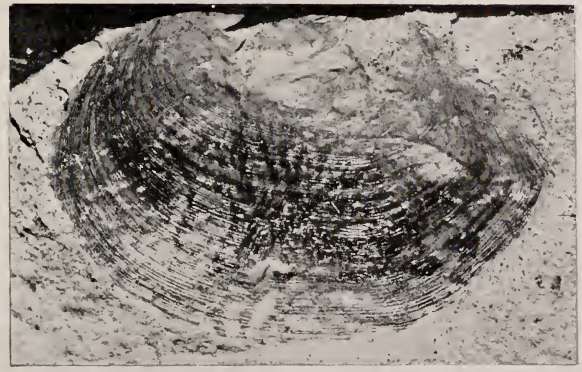

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PLATE 6

PLATE 6

Fig. 1. *Leaia reflexa* Raymond. Holotype. M.C.Z. No. 4711. x 4.

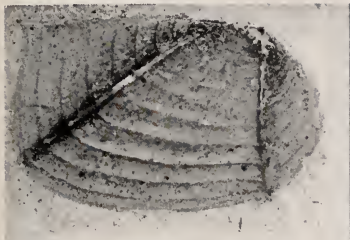
Fig. 2. *Hemicycloleaia laevis* Raymond. The specimen at the upper left is the holotype. The faint anterior carina does not show, but may be seen on the paratype below. M.C.Z. No. 4795. x 1.5.

Fig. 3. *Hemicycloleaia ashleyi* Raymond. Holotype. M.C.Z. No. 4792. x 6 2/3.

Fig. 4, 5. *Hemicycloleaia tricarinata* (Meek and Worthen). Cotypes. Illinois State Museum, No. 10925 x 342. x 1/3.

Fig. 6. *Hemicycloleaia haynesi* Raymond. Holotype (the upper figure). M.C.Z. No. 4803. x 1 2/3.

Fig. 7. *Hemicycloleaia normalis* Raymond. Holotype. M.C.Z. No. 4804. x 2.



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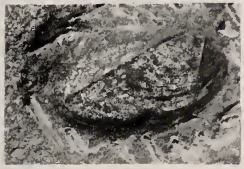

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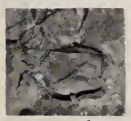

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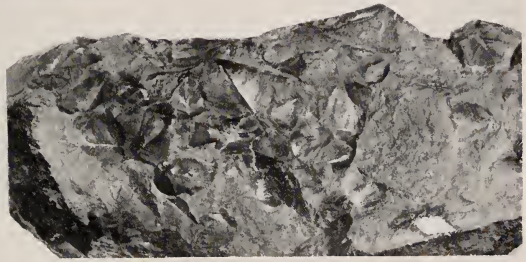

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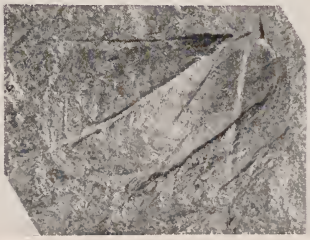

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Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. 96, NO. 4

STUDIES OF SOUTH AMERICAN PSAMMOCHARIDAE

PART I

BY NATHAN BANKS

WITH THREE PLATES

CAMBRIDGE, MASS., U. S. A.
PRINTED FOR THE MUSEUM
DECEMBER, 1946

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OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

The Bulletin and Memoirs are devoted to the publication of investigations by the Staff of the Museum or of reports by specialists upon the Museum collections or explorations.

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No. 4 — *Studies of South American Psammocharidae. Part I.*

By Nathan Banks

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Altho a considerable number of Psammocharidae have been described from South America there was no systematic work of importance until 1897 when W. J. Fox published on the material collected by H. H. Smith during his residence in Brazil. This collection is in the Carnegie Museum. Fox, as well as the earlier authors used but few, mostly European genera. The large species belonging to Pepsis have been more thoroughly collected and described, and Lucas in two papers (1895, 1917) has given an arrangement of them based largely on color and iridescence. Later Brèthes made a key to most of the species of Pepsis, many of which he had not seen.

This paper is based on a considerable amount of material gradually accumulated by the M. C. Z. since the trip of Louis Agassiz to Brazil and Orton's material from the upper Amazon. Prof. J. C. Bradley made a large collection on his South American journey, which together with many other specimens belonging to Cornell, was loaned to me. I have also studied the collection of the American Museum of Natural History, and a fine lot taken by F. X. Williams in Ecuador, British Guiana, and Brazil; also material taken by Dr. Beebe in British Guiana and Venezuela. Mr. Williams has permitted the M. C. Z. to retain types from his collection.

I have compared some specimens with the Smith collection at Pittsburgh, and made notes on others. The descriptions of most of the early authors are not sufficiently complete to enable one to identify with satisfaction. However I think that most of my identifications are probably correct, but some of my new species will possibly prove to be synonyms.

I am chiefly concerned in getting the material into a classification, and have been able to utilize some characters previously neglected, but sometimes not as many as I had hoped to discover. However with the exception of the genus Pepsis, the arrangement is much better than the previous condition, and the results will be useful when applied to the North American fauna.

I have not included the Chilean fauna, as that should be treated separately. The M. C. Z. possesses the Herbst collection, which contains nearly all of the described Chilean species, but only two new ones.

I have already published on the British Guiana material, and a paper on some new species from northern South America is published in the Revista Entomologia Venezolana. The species in those papers are included in the tables presented below.

The remaining three subfamilies will be treated in a second part. A catalogue of all the South American species with a bibliography is in preparation.

Subfamily PEPSINAE

It is about fifty years since Lucas wrote his paper on Pepsis. He had much of the Mocsary material, the types of Dahlbom, Erichson, and Taschenberg and unnamed specimens, mostly of the Berlin Museum. He based his classification on color and iridescence, and his Revision (1917) is on the same plan. Lucas had figures made of the male genitalia, but apparently did not consider them as useful further than the species, and in one case (*grossa* and his "*formosa*") uses the same figure for a black-winged and a rufous-winged species, widely separated in his arrangement. He also gave figures of the third submarginal cell, which though useful, is not of itself of specific value. About two hundred species were based on one sex, about half in each. He identified some of the species described by Frederick Smith, and a few of those described by Lepeletier.

Since then the only considerable article is one by Brèthes based on specimens in the Museums of Buenos Aires, Sao Paulo, and Montevideo.

I have not attempted to study the male genitalia, not because they are not important, but because I feel that a more intensive study should be made of external structures, and the amount and kind of variation in longer series of at least several species.

The iridescence of the wings varies somewhat; age may affect it, but the age of the specimen when collected may be more important. The color of the iridescence is fairly constant, but blue will change to green, and a mixture of colors will sometimes show more of one color in some specimens. It is improbable that any species normally strongly iridescent will lose it, but whether it is "lebhaftig" or "nicht so lebhaftig" is not a specific character. The varying size of the red in the fore wings of *Pepsis rubra*, and of the yellow in the fore

wings of *P. cupripennis* (sometimes completely gone) indicate caution. However, in the *P. pretiosa* section the apical white is very constant. There is variation in the extent of rufous on the antennae, and those species separated on the number of rufous joints, should have other corroborating characters. But those species in which the pale color starts from the base of the third joint are evidently less variable. The size varies considerably in some species, as *sapphirus, defecta, limbata, quitonensis,* etc. But the very large ones, and the very small ones appear less variable in size, as witness the species of Gigantopepsis and Dinopepsis for the large ones, and Stenopepsis, Cirripepsis, and Nannopepsis for the small ones.

The usual type of subgenital plate in Pepsis is rather elongate, slender, flat, rounded or truncate at tip, or even slightly emarginate, and often narrowed at base. There are, however, a considerable number of species which have the subgenital plate of quite a different shape, sometimes only a little broader than the normal (*egregria, pretiosa*), very broad with dense short hair (*defecta*), and with a longitudinal carina (*elevata, cyanosoma,* etc.), some with a median tooth (*reaumuri*), quite a number with a median carina more or less parallel to the raised apical rim, in some cases the plate is very small (*petitii, rubra, equestris, insignis,* etc.).

Whether any of these species are related, say subgenerically, to species with the normal *ruficornis* subgenital plate, is still a question.

The *pretiosa* group seems to me to be natural, yet *insignis* has two parallel ridges, *venusta, cyanosoma, albolimbata* with a longitudinal carina, and *egregria* and *pretiosa* with a flat plate only a little broader than the *ruficornis* type. The females of at least two, *egregria* and *venusta,* are much like the males, but *venusta* is very hairy. Females are unknown, or unrecognized for three species. Perhaps they have not a white tip to wings.

The *festiva* section presents a similar puzzle, males only being known for several species. I believe that several species with wholly dark wings, placed in the section or subgenus Stenopepsis, are really females of the *festiva* group.

Again if we take species that have a rather small plate with the cross-ridge parallel to the raised tip, we have such diverse forms as *insignis, staudingeri, equestris, rubra,* etc. These certainly are not more closely related to one another than they are to species with a different subgenital plate.

Therefore I believe that the natural groups in Pepsis are not defined by the structure of the subgenital plate any more than they are defined by color.

However, in order to simplify determinations based on color and iridescence, I have made tables for those species with certain hair modifications and others with a modified subgenital plate (cf. p. 401). It is very difficult to match sexes in those species which have no markings, and I think that in several cases Lucas has been wrong. In the case of *P. sphinx* for instance, I have a female and several males taken at the same time at Goleta Point, Trinidad. The female agrees with the description, the males have a comb on the tip of the fourth segment, none at tip of fifth; there are a few small hairs on fifth, mostly at sides but certainly no comb. These males agree with the female in venation and other points not of sexual value, except that the antennae are largely dark, in some almost wholly so, especially above.

From the above it may be guessed that the identification of female specimens from the descriptions alone is hazardous, and the association of the sexes, where there are no striking markings, is uncertain.

Abripepsis gen. nov.

Differs from Pepsis in that the first recurrent vein ends nearly one-third way out to plainly more than a third way out on the second submarginal cell. Pepsis has no hair on underside of maxillary cardines. Abripepsis has, which allies it to the Cryptochilinae; the antennae are long and tapering much as in Priocnemioides. From all it differs in having on the clypeus a transverse ridge not far from and parallel to the lower margin of clypeus; just below this ridge is a double clypeus. There are no teeth on the hind tibia, but some Pepsis (as *P. planifrons*) lack teeth. The lip is broad, and fully exposed as in many large Pepsis. The maxillary palpi have the last three joints subequal in length, all short; most Pepsis have the fourth joint much longer than either fifth or sixth. The basal vein ends a little further forward than in most Pepsis.

The only known species is densely hairy. Type *Abripepsis inca* spec. nov.

Abripepsis inca spec. nov. (Fig. 36)

Female. Body black, the notum, abdomen above, and the femora bluish. Antennae pale rufous from the basal fourth of the third joint out. The wings are black, and when fresh show some bluish iridescence, older specimens are duller black; veins deep black, a clear scar in base of first discoidal cell. The head is no broader than the thorax, and the vertex but little elevated; the lower margin of

clypeus concavely excised; a broad groove from anterior ocellus to antennae; lateral ocelli more than twice as far from eyes as from each other.

The clypeus has many bristles above the transverse groove, none below; the head is densely long haired, as also the thorax (pleura and sternum), the notum with much shorter hair; the propodeum very densely long haired, more than *Pepsis xanthocera*; the basal segment of abdomen above and all ventral segments hairy.

The propodeum has a mid-ridge but hidden by hair, before it are rather fine ridges; the posterior slope is steep as in *P. elevata*, scarcely ridged. The abdomen has the basal segment high and broad, and strongly rounded.

The legs are rather slender, the femora with some long hairs, but above on hind femur toward tip are only very minute hairs; the hind tibia above with a row of spines, and before each spine is a short dense row of black hair, the inner spur only about one-fifth of basitarsus; the claws have a tooth before middle.

In the fore wing the marginal cell is rather long, the first recurrent very much longer than the base of the second submarginal cell; the second recurrent ends about two-fifths of the way out on the third submarginal cell, the latter a little longer than broad, both ends somewhat curved, only a little longer below than above.

The male is much smaller, but agrees in venation and color; there is no groove nor ridge across clypeus, the hind tibia with only a low crest of fine hair, the tarsi plainly flattened; the head, thorax, propodeum, basal segment of abdomen, and femora densely black haired as in the female, but the hair on mesonotum is longer than in the female.

The venter has rows of stiff hairs across all segments, no special modifications; the subgenital plate is broad, with convex sides, the tip almost truncate, a faint ridge, which has a shining triangular base, extends along the middle; the surface has short hairs, longer toward tip, and the outer margin fringed with long hairs.

Length of fore wing female 30 mm. to 35 mm., male 18 mm.

From Lima, Peru (Soukup); Matucana, Peru, 27 March, and Lima, Peru (Cornell Univ.).

Type M. C. Z. no. 26202; paratypes there and at Cornell.

Genus Pepsis Fabricius

The genotype is *P. ruficornis* Fabr., described from South America.

The common West Indian species (*sapphirus*) which has usually been called "*ruficornis*" has a male with secondary sexual characters unlike anything I have seen, so far, in South America, so I consider the West Indian form a separate species.

In an endeavor to arrange the species in more natural groups than those based on color, I have found a few structural characters that I believe indicate natural groups, which I shall treat as subgenera. In several of the groups the characters are not so definite as I could wish, and in some, species are included which may not belong there on further study.

Lucas (in 1919) made a new subgenus, Gigantopepsis, for his *Pepsis gigantea*; he used the position of the tooth on hind claws. A better character I think is the strongly curved last joint of hind tarsus, as well as the curved bristles from base of claw. All the species I place here are large.

For a number of very hairy species, in which the clypeus is wholly and densely long haired I use Trichopepsis; the type *Pepsis limbata*; *P. xanthocera* and some allied forms I place here but they may belong elsewhere.

For those species which are rather slender, the ocelli on top of head, and no elevated ridge behind them, I use Stenopepsis, *P. hymenaea* the type.

In some of the small forms the hair at tip of abdomen above is fine and not bristly, and is mostly erect, not sloping toward tip; the legs are often hairy as well as body. I place these in two subgenera, Nannopepsis for those in which the last ventral segment is concave, and Cirripepsis for those in which this last segment is convex.

For the few large forms with hair on underside of front legs in female, and in male the subgenital long, down curved, and densely long haired, I use the subgenus Dinopepsis. In South America I know only four such species, *grossa*, *theresiae*, *inclyta* and one which may be *prudentipolitana*.

The body of the remaining species I leave, for the present, in Pepsis, type *Pepsis ruficornis* Fabr., but I am aware that there are groups, such as the *pretiosa*, the *decorata*, the *festiva* sections, which will be separated as time and material increase our knowledge.

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Subgenus Gigantopepsis Lucas, 1919

The character used by Lucas is that the hind claws have the tooth beyond the middle, often near apical third or fourth of the claw; and that before the tooth is a series of stout, somewhat sinuous bristles reaching much beyond the tooth. In the species I have seen the hind tarsus is much more strongly curved than in other Pepsis. They are all very large.

Type *Pepsis gigantea* Lucas.

I cannot be sure of recognizing this species. I have three specimens from Bolivia and two from Brazil which I thought might be it; the antennae in these are rufous except the base. Of the type (1895) he says the greater part of antennae lacking; but in 1919 in his Revision he describes another specimen as *gigantea*, saying the antennae are black, and other points not mentioned in the original description.

The Central American *P. optima* and the Ecuadorian *P. toppini* belong in this subgenus, likewise several of the species with golden hair on body.

Synopsis of females

1. With golden or yellowish pubescence on head or thorax 2
   No golden or yellowish pubescence on head nor thorax 3
2. Wings black ..... *sumptuosa*
   Wings yellowish ..... *plutus*
3. Wings ferrugineous, darker at tips ..... *toppini*
   Wings blackish, brown, or castaneous 4
4. Antennae black or dark, extreme tip may be rufous 5
   Antennae from third joint to tip rufous 6
5. Fore wings dark brown to black, tip paler, base of hind wings not yellowish ..... *gigantea*
   Fore wings castaneous, slightly paler towards tip, both wings yellowish at base ..... *cleanthes*
6. Tip of fore wings rather broadly pale and brassy, the pale extending a little on hind border ..... *alcimeda*
   Fore wings not paler at tip ..... *amalthea*

Males

1. Thorax with some golden or yellowish hair 2
   Thorax without golden hair 5

2. Wings uniformly deep black 3
   Wings at most dark rufous, or blackish hyaline 4

3. Abdomen with golden band at end of first segment of abdomen. *sumptuosa*
   Abdomen with golden bands at tip of most segments ..... *speciosissima*

4. Hind legs and antennae mostly rufous; wings rather brownish rufous ..... *aurifex*
   Hind legs and antennae black, antennae rufous near tip; wings faintly blackish hyaline ..... *aurozonata*

5. Fore wings not darkened before pale tip; third cell little if any longer than broad; basal segment of abdomen extremely slender ..... *eubule*
   Fore wings plainly darkened before the scarcely paler tip; third cell much longer than broad, tip bent below middle; basal segment of abdomen normal ..... *astarte*

PEPSIS (GIGANTOPEPSIS) ALCIMEDA spec. nov.

Black, with some bluish iridescence on head, thorax, and abdomen; legs black, hind femora somewhat bluish above; antennae black at base, rufous from near tip of third joint out to tip. Wings about as black as *amalthea*, but the tip of fore wings beyond the closed cell is plainly paler, but not hyaline; no yellowish in base of either wings.

Clypeus arcuate below, but hardly as deeply so as in allies, lower half bristly; ocelli in a slightly broader triangle, the laterals about twice as far from the eyes as from each other; vertex rounded above eyes; third antennal joint equal vertex-width; propodeum with a long fairly high mid-ridge, the middle part concave, about twelve ridges before it, the last one some distance before mid-ridge; stigmal tubercle very low and rounded, lateral tubercles small but prominent, mesosternal moderately large, rounded, and some distance before mid coxae.

Abdomen with basal segment a little more slender than in *amalthea*. Legs slender, hind tibia with a row of obliquely placed teeth, moderately low and rather more pointed than in *amalthea*, the stout spines twice as high, inner spur hardly one-fifth of basitarsus; hind claws with tooth about at apical fourth, five bristles before it, the last four stout and slightly bent in passing over the tooth; mid and front claws with tooth somewhat before the apical fourth.

In fore wings the first recurrent vein is plainly longer than base of the second submarginal cell, second submarginal cross-vein bent a little near base, then sloping obliquely backward, third submarginal cross-vein slopingly curved, the outermost point is below the middle (much as in Lucas figure 271), the cell about one and one-third as long as high, receiving the second recurrent vein (very oblique) scarcely beyond basal third.

Length of fore wing 45 mm.

One female from Santa Cruz, Bolivia (Steinbach). Type M.C.Z. no. 26204.

Pepsis (Gigantopepsis) amalthea spec. nov. (Fig. 2)

Black, body showing more or less bluish; legs black; antennae rufous except first, second, and basal part of third joint black. Wings dull blackish, against light transparent, a little paler toward tips.

Clypeus with lower margin broadly concave, lower half bristly; ocelli in a rather narrow triangle, laterals almost twice as close to each other as to eyes; third antennal joint equal vertex-width. Propodeum with moderately broad mid-ridge, before it the dozen ridges are rather irregular; stigmal tubercle low and broad, lateral tubercle high and prominent, mesosternal only a low rounded hump, not very near mid coxa; posterior slope with several distinct ridges.

Legs long; hind tibia with a row of low teeth obliquely placed, each tooth sloping toward tip of joint, the stout spines much higher, inner spur hardly one-fifth of basitarsus; as in allied species the hair on middle part of inner tip of hind tibia is yellowish brown; the hind claws have the tooth about at apical fourth, five spines before tooth, the last three very stout and sinuous and reaching tip of claw, mid and front claws with tooth a little before apical fourth.

In the fore wings the first recurrent vein is plainly longer than the base of second submarginal cell; the second submarginal cross-vein slopes obliquely backward, the third submarginal cross-vein is curved, but the upper part is more flattened; the third cell about one and one-fourth times as long as high (much as in Lucas figure 132), the second recurrent (very oblique) ends a little beyond the basal third.

The head is sparsely haired, mostly near eyes, pronotum with moderately long hair above, lower lobes with little short hair, pleura, sternum, and propodeum with longer and denser hair, venter with long hairs across each segment, the last wholly bristly, above the

last is also entirely bristly and some hairs across apical part of the preceding segment.

Length of fore wing 42 to 45 mm.

Three females from Santa Cruz, Bolivia (Steinbach), one from Urucum, Brazil and one "Amazonas" (Cornell). Type M. C. Z. no. 26205, paratype there and at Cornell Univ.

Pepsis (Gigantopepsis) Cleanthes spec. nov. (Fig. 3)

Dull black, scarcely a trace of bluish anywhere; legs and antennae, tip of last antennal joint rufous. Wings castaneous, darkest (almost brown) at base, paler toward tip, not hyaline; in fore wings the base of anal cell and somewhat in front of it is yellowish, making a pale area before the dark of basal part; in the hind wing this yellowish area is larger and occupies most of anal lobe, a very distinct contrast with rest of wing.

Clypeus broadly arcuate below, bristly on lower half; ocelli in a rather narrow triangle, the laterals scarcely diameter apart, nearly three times as far from the eyes; antennae rather short, third joint just about equal vertex-width; vertex evenly rounded; propodeum with a hind and long mid-ridge, truncate across the middle part, extending laterally well down on sides, in front of it are about twelve ridges, the last some distance before the mid-ridge, posterior slope with two ridges on upper part, stigmal tubercle rather large, but not high, lateral tubercle small, but high, mesosternal low and rounded.

Legs slender; hind tibia with row teeth more elevated and pointed than in *amalthea* and placed less obliquely, the spines not twice as long, inner spur about one-fifth of basitarsus; hind claws fully two-thirds of fifth joint, with tooth nearly at apical fifth, six bristles before it, the last three very stout and slightly sinuous, and nearly reaching tip of claw; mid claws with tooth almost as far out, front claws with tooth at apical fourth.

In fore wing the second recurrent is little longer than base of second submarginal cell, the second submarginal cross-vein is bent near base and then slopes obliquely backwards, the third submarginal cross-vein is bent angularly in the middle, and third submarginal cell (much like Lucas figure 123) is nearly one and one-half times as long as high, the second recurrent (very oblique) ending at about two-fifths from base.

Scanty hair on head and pronotum, longer but not dense on pleura,

sternum, and propodeum; last segment of abdomen bristly, and bristles on apical part of the segment before; venter with row of few hairs on each segment, but last more densely hairy.

Length fore wing 38 mm.

One female from Santa Cruz, Bolivia (Steinbach); type M. C. Z. no. 26203.

A male from near Santa Cruz, Bolivia (Steinbach) has the body and wings about as in female, the wings a little darker, about yellowish brown, with a wide hyaline apical margin extending almost to the closed cells in both pairs of wings; in both wings the base has the same yellow marks as in female, and in the hind wings the yellow extends out one-third way in anal cell; the antennae are very stout, black; the propodeum has a very high but short mid-ridge, lateral tubercles very prominent, the upper surface of propodeum with much long hair; the hind tibiae and tarsi strongly compressed, the crest on basitarsus higher than in *aurifex*, about one-half the height of the joint.

Clypeus about twice as broad as long, angularly emarginate below, surface punctate, mostly below; lateral ocelli a little nearer each other than to the eyes, pronotum with only a few short hairs on lower lobe.

Fore wings with the third submarginal cell not quite as nearly angulate behind as in the female.

Abdomen broken behind first segment.

Length of fore wing 32 mm.

Allotype in Cornell University.

Pepsis (Gigantopepsis) eubule spec. nov.

♂ Black, with bluish iridescence; legs black, femora bluish; antennae rufous, first and second joints black. Fore wings much as *aurifex* but with a little more reddish, the tip hyaline just beyond the third submarginal cell for about one-half the width of marginal area; hind wings about as dark, no pale tip but margin rather darker.

Head small; clypeus rather long and narrowed below, lower margin angularly concave, surface with many very short hairs, a few bristles near tip; lateral ocelli about one and one-half times as far from eyes as from each other; front and vertex with much long hair, pronotum also, pleura with long but more scattered hairs; propodeum with very prominent mid-ridge, or rather cone, lateral tubercles also large and prominent; surface with long but not dense hair. Abdomen

more slender than in those of the *aurifex* section; last and next to last segments above with few very short hairs; venter with few hairs on third segment; fourth and fifth segments with a curved row of hairs across, the row not dense, the hairs curved backward at tips, the row on fourth segment broken in middle; subgenital plate short and broad, a ridge across middle, beyond the surface is polished, in front it is punctate and hairy on middle, polished on sides.

Hind legs with strongly compressed tibiae and tarsi, the fringe on basitarsus (and other joints) both above and below very high, claws rather strongly curved.

Venation much as in others, the third submarginal cell rather short, upper side as long as base, outer side curved below the middle, the second recurrent ends at about the first third.

Length of fore wings 35 mm.

From Barro Alta, Minas Geraes, Brazil, November (José Blaser). Type M. C. Z. no. 26207.

Pepsis (Gigantopepsis) astarte Banks

This was described from males from the Santa Marta district of Colombia. It may be the unknown male of *toppini*.

Pepsis (Gigantopepsis) aurifex Sm.

Only males are known and readily recognized by their mostly yellowish legs. Specimens from Province Sara, Santa Cruz, Bolivia, and Urucum, Corumba, Brazil.

Pepsis (Gigantopepsis) speciosissima Lucas (Fig. 5)

Proposed by Lucas in 1919 for *speciosa* Smith, which was preoccupied.

Males from between Queremal and Buenaventura, Colombia, 3500 to 4000 ft., 22 January, 17 March (Huntington) A. M. N. H. Agrees well with the description, except there is no basal pale band on third segment (Smith's specimen may have the third segment distended to show basal membrane). The wings are evenly black. The structure is like *P. aurozonata*; there are no hair modifications on venter; the subgenital plate is long and broad, tapering somewhat to the rounded tip which is notched in middle, the surface is covered with a dense mass of short, erect black hair, but a bare space near each basal corner. The third submarginal cell is moderately long, upper side equal to base, outer side almost angulated, second recurrent ends just beyond basal third.

Pepsis (Gigantopepsis) toppini Turner

From Banos, Tunguragua, Ecuador, 1600 m., 20 August (MacIntyre); Abitagua, Oriente, Ecuador, 1000 m., (MacIntyre). Described from northern Peru.

Pepsis (Gigantopepsis) plutus Erichs

Specimens from Kartabo, Georgetown, and Mazaruni River, all in British Guiana, and one from Belem, Para, Brazil. A male from Kartabo agrees well with Smith's description of *P. aurozonata* and I believe it is the male of *plutus*. There are no hair modifications on the venter; the subgenital plate is rounded at tip, broadens toward base, where it is suddenly widened by an angular projection each side, the entire surface with scattered long hairs. (Fig. 6)

Pepsis (Gigantopepsis) sumptuosa Sm. (Fig. 4)

From Chapada, March (H. H. Smith), Tolima, Aguatal, and San Antonio, all Colombia, also "Colombia" (Amer. Mus. Nat. Hist.)

The male in head, thorax, and propodeum is colored like the female; the antennae is rufous from base of third joint; the abdomen shows a broad golden band across tip of the first segment, with a median line extending toward base; the wings are the same rich dark brown as the female, and in the base of hind wings the same yellowish area. The fifth ventral shows some scattered erect hairs, and the sixth has a hair-brush across base. The subgenital place is large, broad and as broad at tip as base, nearly square, but outer corners rounded, and here the sides somewhat flaring, the surface has a dense mass of short black hair except near sides, especially behind.

Subgenus Trichopepsis Banks

Females

1. Wings almost wholly black 2
   Wings largely rufous or yellowish 7
2. Antennae mostly yellowish including part of third joint 3
   Third joint and several beyond black 6
3. Wings wholly black; hind femora not hairy, no hairs on abdomen above except near tip 4
   Wings pale at tip or with some yellowish marks near middle; abdomen with hairs above 5
4. Second plus third joints of antennae equal vertex-width; inner spur of hind tibia hardly one-fourth of basitarsus; fore wings about 30 mm. long ..... *xanthocera*

Second plus third joints of antennae not equal to vertex-width; inner spur of hind tibia about one-third of basitarsus; fore wings hardly 20 mm. long ..... *peruana*

5. Tip of fore wing pale but hardly white; inner spur nearly one-half of basitarsus ..... *cassiope*
Tip of fore wing dark; in middle of wing some irregular rufous or yellowish marks; inner spur shorter; abdomen very hairy .... *iolanthe*

6. Tip of fore wings plainly pale; third submarginal rather short, end scarcely curved; inner spur nearly one-half of basitarsus ..... *elisa*
Tip of fore wings not pale; third submarginal longer, end strongly curved below; inner spur scarcely one-third of basitarsus ..... *ismare*

7. Tip of fore wings nearly hyaline, base of fore wings black and rather sharply limited 13
Tip of fore wings brown to black; antennae black 8

8. Hind wings blackened nearly one-third way out 9
Hind wings much less blackened 10

9. Fore wings have a sharply marked dark border; all femora hairy at base and tip ..... *quitonensis*
Fore wings largely dusky or blackish, the dark at base and tip fades gradually to a general color, only a rather small area toward middle of front yellowish ..... *nessus*

10. Base of fore wings blackened for almost one-half way to basal vein, and of hind wing as far; apical brown border does not reach the closed cells; hairs on femora and long hair on all ventral segments ..... *nigricans*
Base of fore wings much less blackened 11

11. Basal part of propodeum curving into posterior slope, no mid-ridge and hairs not more dense at any point; basal vein ends the length of transverse before transverse ..... *fasciculata*
Propodeum with front part separated from posterior slope, a short mid-ridge and the hair here so dense as to obscure the ridge 12

12. Posterior slope flat across, steep, ridged; basal vein ends not the length of transverse before transverse; wings clearer yellowish ..... *limbata*
Posterior slope not so steep; wings dull yellowish, basal vein .... *lurida*

13. Antennae yellowish from third joint out; hind claws with three very stout bristles from base; in most views the front wings largely golden or silvery; in hind wing the black occupies nearly one-third of wing ..... *petitii*
Antennae black; wings yellowish hyaline; in hind wings black does not occupy nearly one-third of wing; all femora hairy ..... *tolteca*

Males

1. Tip of fore wings pale, nearly hyaline 2
   Tip of fore wings brown to blackish 3
2. No tufts on fourth ventral segment; black at base of fore wings quite sharply limited 8
   Tufts on fourth ventral segment long, and of about fifteen hairs in each ..... *huascar*
3. Black on base of hind wings one-third way out; about twenty hairs in each tuft ..... *quitonensis*
   Black on hind wings less extensive 4
4. Rather short tufts of erect hair on both fourth and fifth segments; antennae rufous ..... *atahualpa*
   Loose tufts of long, curved hairs on only fourth segment 5
5. The hairs on each side of fourth ventral are obliquely placed and tend to form (usually with a few short hairs) a curved row 6
   The hairs on each side are further apart and not obliquely placed, and do not form a curved row 8
6. Only along front margin are there a few connecting hairs, rest of space between tufts smooth and polished ..... *limbata*
   Between the tufts the surface has many hairs, and the surface punctate, not polished 7
7. The tuft each side is usually of but five or six hairs; the dark apical border of fore wing extends into the third submarginal cell and behind ..... *lurida*
   The tuft each side is usually of ten or fifteen hairs; the dark apical border of fore wing does not extend into closed cells ..... *polita*
8. Wings silvery above, black beneath; subgenital place with a ridge across middle parallel to the apical ridge ..... *petitii*
   Wings yellowish hyaline, subgenital plate rather large and long, with two nearly parallel longitudinal ridges ..... *tolteca*

Pepsis (Trichopepsis) cassiope Mocs.

Females from Santa Cruz, Bolivia (Steinbach).

The corners of terminal ridge of propodeum are rather high and clothed with long hairs; there is no distinct mesosternal tubercle; the teeth on hind tibiae are quite long, basal side nearly twice as long as apical edge, and the teeth close together at base; there are scarcely any distinct ridges or striae on the metanotum.

Pepsis (Trichopepsis) quitoensis Pack.

Abundant in Ecuador; Mera, February; Ambato, December; Banos, 6000 ft., 27, 29 December, January, 26 October, all by F. X.

Williams; Yunguilla, Rio Pattapa, Oriente, 1400 to 1800 m., 10 September; Banos, Tunguragua, 17 to 1900 m., August, all by W. MacIntyre; also Valle de Pappas to S. Augustine, Colombia, 6 April; and many from Banos and Mera, Oriente, Ecuador in October, December, January and February from Mr. Williams.

Described by Cameron, as *P. andicola*, by Mocsary *P. sibylla*, and *P. chilloensis* Cameron appears to be the same, as several specimens agree and others intermediates. The type of Packard's name is here at the M. C. Z. no 498. The mesosternal tubercle is small but distinct, set just before slope; corners of terminal ridge high.

Pepsis (Trichopepsis) limbata Spin.

Many from various places in Chile; also San Mathias Bay, Patagonia (Hassler Exped.), Cordova, (Davis); Mendoza (C. S. Reed, Cornell Univ.); Chacra de Coria, 9 December (Joergensen), all in Argentina, also La Rioja (Giacomelli) (Cornell); Poterillos, Mendoza (Cornell); and Coroica, Bolivia (Cornell Univ.).

The corners of the terminal ridge are low and rounded; mesosternal tubercle quite large and placed well before the slope; the mesonotum shows one or two short ridges each side of median furrow.

Pepsis (Trichopepsis) patagonica Brèthes

This differs from *limbata* in having but ten to twelve hairs on each side of fourth ventral segment in the male, the hairs very long, erect, and the tips incurved; the fourth and fifth ventral segments are smooth and shining. The dark at tip of wings extends somewhat into third submarginal cell, and in hind wings of male extended out further than in *limbata*.

One male from La Rioja, Argentine (Giacomelli) Cornell.

Pepsis (Trichopepsis) fasciculata Brèthes

Males and females from Huascapiatana, Rio Tarma, Peru, 1 to 2 June (Cornell Exped.), and same place (Huascapiatana), 1800 m., 4 March (Weyrauch); also San Nicolas, Cam. del Piohis, 5 to 7 July, also Peru (Cornell Exped.); also one from Rio de Janeiro, Brazil.

The corners of the terminal ridge of propodeum are rather high but not sharp-pointed; the mesosternal tubercle is high and pointed, directed a little outward, and set near edge of slope.

Pepsis (Trichopepsis) nigricans Lucas

A female from Poterillos, apparently named by Brèthes; agrees well with the description of Lucas. The clypeus has long hair all over, long hair on thorax, propodeum, venter, coxae, and shorter on femora. Base of fore wing black one-half way to basal vein, and hind wing equally as far out, the apical brown border of fore wings stops a short distance beyond the closed cells; end of third cell angulate behind. Corners of terminal ridge very low; mesosternal tubercle merely an angle; hind tibiae with small, mostly sloping, well-separated teeth, not nearly as high as the spines.

Pepsis (Trichopepsis) lurida Lucas

This has been recorded from Argentine, but I have seen specimens only from Chile, where it is fairly common.

Pepsis (Trichopepsis) nessus Lucas

Both sexes from Banos, Tunguragua, Ecuador, 1600 to 1900 m. (Mac Intyre); Yunquilla, Ecuador, 1800 m., 10 Sept. (Mac Intyre); between Queremal and Buenaventura, Colombia, January and February (H. Schwarz, in Amer. Mus. Nat. Hist.).

Pepsis (Trichopepsis) polita Brèthes

Specimens examined are from St. Catharina, and Mafra, Brazil, March, 1940 (A. Maller coll.); all are males.

Pepsis (Trichopepsis) tolteca Luc. (Fig. 15)

Males and females Ninabamba (near Ayacucho) 1900 m., Peru, December (Weyrauch); Andahuaylas, Peru, 13 December (Weyrauch); Matucana, Peru, 27 May (Cornell Univ.). The mesosternal tubercle is low and close to slope.

In the male the subgenital plate is rather broad, tapering to a broad blunt tip, somewhat turned down, the under surface convex and with a carina each side, starting close together near tip of plate and sloping concavely outward outer base of plate.

Pepsis (Trichopepsis) huascar spec. nov.

Male. Black, more or less blue on head, thorax, and abdomen above, legs and antennae deep black; wings yellowish, black on base in fore wing extends about halfway to basal vein, and fades gradually

into the yellow, extreme tip hyaline; in hindwing the black extends out from one-third to nearly one-half, fading into the yellow; head, thorax, propodeum densely clothed with long black hair, shorter hair on basal segment of abdomen and some above on second segment, venter hairy, coxae densely long-haired, front and mid femora below with fine long, curved hairs, a few at base of hind femora.

Clypeus angulately emarginate below, hairy all over; antennae moderately thick, segments beyond middle are swollen in middle below, concave above. Propodeum low, no mid-ridge; abdomen very slender, last segment above with short hair; fourth ventral segment with a pencil tuft each side on apical half of segment, hairs, about fifteen to twenty, are long, erect, with incurving tips, making a loop fully one-half as high as space between bases of tufts, last three ventral segments shining black, others blue; subgenital plate truncate at tip; hind tarsi compressed, but the crest above basitarsus hardly obscures the bristles, inner spur scarcely one-third of basitarsus.

In fore wings the second submarginal is very oblique at base, slightly rounded at tip; third submarginal below two-thirds of second below, narrowed more than one-third above, outer side curved, but little sloping, receiving the second recurrent (little curved) before middle; in hind wing the anal vein ends about half-way from margin to forking of cubitus.

The fourth segment has on each posterior side a tuft of long black hairs, at tip curving toward each other, about fifteen to eighteen in number; the subgenital plate not very long, narrowed toward base, almost concave in middle of tip, which has short hairs, general surface not hairy.

Length of fore wings 18 mm.

From Yucay, Peru, December, (Sankulp coll.) Cornell Univ., paratype at M.C.Z. no. 26691.

Pepsis (Trichopepsis) atahualpa spec. nov.

Male. Body and legs deep black, antennae rufous, first and second joints dark; wings pale ferrugineus, almost hyaline in middle of cells, veins rufous; base of both wings black, in fore wing reaching almost one-half way to basal vein, in hind wing not quite so far; anal lobe partly black; outer and hind margins of both wings narrowly brown; in fore wings the brown of tip occupies nearly one-half of post cellular area. Body densely clothed with long hair, abdomen above and

basal joint of antennae not hairy, some on lower part of all femora are longer than width of joint.

Clypeus evenly and arcuately emarginate below, lateral ocelli much nearer to each other than to eyes, from in front the vertex is curved; antennae heavy, joints scarcely swollen below; scutellum slightly elevated, propodeum with a high, but short, mid-ridge, and at sides the tubercles prominent, coarsely striate above, basal part more than twice as long as posterior part, latter slightly concave; basal segment of abdomen rather long, and with a distinct cone-like projection each side toward base; hind legs long, tibia crested hiding the bristles; basitarsus and second and third joints almost as strongly crested as in males of the *plutus* section.

Venter very hairy on second segment (beyond groove) and also on third segment; on fourth a low crest each side with incurving tips to hairs, fifth segment with a higher crest each side, these crests are further apart than the height of the crest, between them on both segments there are short hairs; the subgenital plate is rather slender, with a rounded tip, fringed with short hair; the sixth segment has on hind margin a short distance from plate a slender process with a minute hook at tip.

In fore wings the marginal cell is more than half its length from wing-tip; second submarginal cell twice as long below as broad; third two-thirds as long as second below, narrowed one-fourth above, outer side curved, receiving the second recurrent vein (slightly curved) beyond basal third; in hind wings the anal vein ends nearer to hind margin than to forking of cubitus.

Length of fore wings 31 mm.

One male from Celerdin, Peru, 2600 m. November (Weyrauch). Type M. C. Z. no. 26693.

Pepsis (Trichopepsis) circe Mocs.

Male from Venezuela (A. Lichy).

Pepsis (Trichopepsis) peruana Lucas

Female from Lima, Peru (Soukup coll.); Lomas of Lachay (near Chancay) 600 m., Peru (Weyrauch).

Mesosternal tubercle small, a little before slope; corners of terminal ridge rather high and almost pointed.

Pepsis (Trichopepsis) xanthocera Dahlb.

Females from Kartabo, July-Aug. (Wheeler), 20 May (Beebe); Mayaro Falls, Trinidad, 4 December (Weber); Northwest part of Trinidad (Ballou, Urich, Fennah); Vista Nieve, Santa Marta, Collombia, 5000 ft. 10 February (G. Salt); Marcajú, Matto Grosso (Brazil) April-May (Fairchild); Iquitos, San Rogué, Peru, March (Klug Coll. Cornell Univ.), Jatun, Yacu, Rio Napo watershed, Ecuador, 700 m. (MacIntyre); St. Laurent, Guyane; Mishayaco, Peru, 29 August (Klug coll. Cornell).

The corners of terminal ridge are rather high, but rounded at tip.

Pepsis (Trichopepsis) iolanthe spec. nov.

Body jet black, with much mostly long black hair, all over clypeus, long on pronotal lobes, on pleura, and propodeum; all coxae heavily long-haired beneath; abdomen hairy both above and below, long on first segment, other ventral segments rather densely hairy mostly in middle, tip densely hairy, above with many sloping bristles, the second segment above with quite short hair, but nearly all over, other segments behind with longer hair, as much so as *P. cassiope*; basal part of all femora with some long hairs.

First, second and most of third antennal joints black, beyond rufous; legs black; fore wings black at base nearly to middle of basal cell, costa black, rest of surface a dark brown, with rufous streaks toward base; a long rufous streak from middle of basal cell out to marginal cell, and over most of first discoidal cell; another streak, more slender, behind the anal vein, the transverse vein, and those bordering second submedian cell with a yellowish to pale rufous border; in hind wings the basal black extends over fully basal third, beyond this the veins are more or less bordered with pale except near tip.

The head is rather small; clypeus punctate nearly all over, lower margin very slightly concave. Face a little narrowed above, from in front vertex arched between eyes, hind ocelli about twice as close to each other as to eyes; second plus third antennal joints short, almost equal vertex-width. Median metanotal groove very wide behind. Propodeum rather slender, above nearly horizontal, the numerous ridges rather faint on sides, the mid-ridge very small, hidden in dense hair; posterior slope with some coarse ridges and finer ones near the terminal ridge, latter is low in middle, each end with a pointed cone, not very high; basal tubercle large, lateral ones small.

Abdomen not very high, second segment much broader than high, the groove on second ventral curves back each side and the area before it raised.

Legs of moderate length, front femora slender; hind tibiae above has on inner edge a row of rather large triangular teeth, fairly close together, much like edge of a saw, but each tooth set obliquely, on outer edge is the row of stout spines, the base of many of them enlarged into a small tooth-like piece; inner spur nearly one-half of basitarsus.

In fore wings the second abscissa of radius is hardly longer than the third, upper side of third submarginal cell nearly equal to lower, cell much like figure 113 of Lucas, but longer, the end only slightly curved, second recurrent ends a little before middle of cell; first discoidal cell very slender; basal vein ends much in front of transverse, much more than one-half the length of transverse.

Length of fore wings 38 mm.

One from Vista Nieve, San Lorenzo Mt., Colombia, 20 December (Bequaert). Type M. C. Z. no. 27202.

By great pilosity related to *xanthocera*, but the rufous in fore wing, and much more hair on ventral segments, and long inner spur.

Pepsis (Trichopepsis) elisa Montet

One female from Belem, Para, Brazil (Martorelli). In general similar to *cassiope*, however, there is no hair on abdomen except toward tip, the tip of fore wings more broadly pale, the third submarginal cell shorter and broader and the second recurrent ends near middle of cell, and the spines on hind tibiae are smaller and more separated, more erect and pointed; the hairs as long as teeth, and the spines and bristles longer. The corners of terminal ridge fully as high as in *cassiope*, and with short hair; there is a tiny, almost rudimentary mesosternal tubercle, much before slope.

Pepsis (Trichopepsis) ismare spec. nov.

Closely similar to *P.* (*Trich.*) *xanthocera* except in the dark antennae. The wings, however, have not fine bluish iridescence, but in certain views somewhat coppery, else dull black; the fore wing has the base of marginal cell and base of apical cell yellowish as in *xanthocera* and there is the oblique yellowish streak from base of stigma; the antennae are black, but more brown toward tip; the head, thorax, and abdomen more bluish than in *xanthocera*; the head, thorax, propodeum, pleura,

and coxae are as densely long-haired as in *xanthocera*. The antennae taper considerably toward tip as in *xanthocera*, but are shorter.

Propodeum shows no distinct mid-ridge, and before it the striae are numerous and fine, not very distinct; the posterior slope little more than one-half the basal part, and has some parallel ridges, especially in middle, lateral tubercles small. Basal segment of abdomen with considerable hair, tip of abdomen densely hairy and with many sloping bristles, venter with few hairs. Front femora with a few hairs below; teeth on hind tibiae similar to those of *xanthocera*, but a little closer together, inner spur very short.

Length of fore wings 28 to 31 mm.

Two females from above Bucay and at Naranjapata, 1850 ft., December, Ecuador (F. X. Williams). Type M. C. Z. no. 27139; paratype with Mr. Williams.

Pepsis (Trichopepsis) petiti Guérin (Figs. 7, 16)

This beautiful species was described in 1832, and scarcely mentioned since. Mocsary saw the female type in the André collection and made notes thereon; Lucas had not seen it. The male was unknown.

A pair was received from Dr. Weyrauch, the female taken at Lima, Peru, 1 January 1939, the male from Catairo, Peru; Dr. F. X. Williams took a pair at Guayaquil, Ecuador, 25 November.

The color of body, antennae, and legs are as Guérin states. The wings are difficult to describe; the fore wings of female are densely covered with minute hairs which obscure the membrane and veins. They are of a silvery to yellowish to golden color according to the view and light. The extreme base is deep black for about one-half the width of thorax; beyond the closed cells the wing is paler and with a hyaline tip which occupies about one-half the width of the area; from there to about the second branch of medius the wing shows a darker brown hue due to the deep brown of the under surface in that part, before that the basal half of under surface is golden; on the under surface the dark veins show very distinctly, above they are hardly noticeable.

The hind wing has the basal third deep black, beyond it is golden, but with a broad hyaline margin touching end of the radial sector and behind ending at the anal vein; beneath the hind wing is colored much as above.

In the fore wing the first recurrent vein is plainly longer than the base of second submarginal cell, the second recurrent vein (slightly

sinuous) ends plainly before the middle of the third submarginal cell, the upper side of which is not so long as the basal and but little if any more than one-half of the lower side; the end of cell is much like figure 246 of Lucas.

The head is hardly wider than the thorax; the clypeus broadly concave below, the upper two-thirds with many stiff bristles; the lateral ocelli not quite twice as near each other as to eyes; the antennae only moderately long, the third joint not nearly equal to vertex-width. The head is hairy, but not long hairs, those in middle of front equal those on the sides; pronotum hairy all over; metanotum with very short hair, but pleura and sternum are densely long-haired, and the propodeum as densely as in *Pepsis xanthocera*; the basal segment of abdomen shows only minute hairs above but very long ones beneath; and all beyond the groove very hairy, but not densely, nor much denser on the last segment.

The propodeum is rather short, basal part but little convex, with about ten ridges, mid-ridge faint, posterior slope very steep as in *P. elevata*, not ridged; stigmal tubercle low and broad, the lateral small and hidden by hair, the mesosternal small and at base of coxal slope. The legs are short, front tibia not equal width of head; femora with some stiff hairs toward tip; the hind tibia above with a row of short teeth and numerous bristles or spines more than twice as high; inner spur hardly one-fourth of basitarsus; last joint of hind tarsus a little curved, the claws not one-half of the joint, the large tooth plainly before middle, there are three stout curved bristles before the tooth, not as sinuous as in Gigantopepsis.

The male is similar to the female; the fore wings are more broadly black at base, almost half way, the hyaline outer margin is broader than in female occupying over two-thirds of the area; from the black to the hyaline the surface is densely clothed with minute silvery hairs, in some views near the black or along veins showing yellowish; the under surface is black on base and extending out along anal cell, beyond it is rich brown to the hyaline, some veins toward base are bordered with yellowish; the brown of the under surface makes the upper surface quite dark when viewed directly from above. The hind wing beyond the black is golden out to the hyaline, and also on the under surface. Venation much as in the female, but the first recurrent vein hardly longer than the base of the second submarginal cell. The antennae are moderately thick. There are no hair modifications on the fourth or other segments; the hair is fairly dense and erect across each segment beyond the groove; the subgenital plate

small with two slight ridges each side; the genitalia (figure 7).

Length of fore wing, female 32 mm.; male 25 mm.

Subgenus Dinopepsis Banks

Synopsis of Species

1. Tip of fore wings pale; the teeth on hind tibiae set obliquely . . 2
   Tip of fore wings dark; the teeth on hind tibiae scarcely oblique, practically forming a line 3
2. Both fore and hind wings equally deep black, except the narrow hyaline tip . . . . . *grossa*
   Fore wings brown, much darker than the hind wings which are barely yellowish, in male the base of hind wings is broadly black . . . . . *theresiae*
3. Both fore and hind wings evenly black . . . . . *prudentipolitana*
   Both fore and hind wings mostly rufous or yellowish, except the dark brown tip . . . . . *inclyta*

Pepsis (Dinopepsis) grossa Fabr.

Various specimens from St. Augustine, 28, 30 May; Maracas Falls, 23 September, both Trinidad and taken by N. A. Weber; N. West part of Trinidad (Ballou, Urich, and Fennah); Aracatara, Magdalena, Colombia, 18 January (G. Salt); Sevilla, Magdalena, Colombia, 25 March, 8, 9 May, 21 July, 1, 9 December (G. Salt); San Lorenzo Mts., Colombia (Bequaert); Caldras, Caucatel, Colombia, and Colombia (Ovallo) A. M. N. H.

Teeth on hind tibiae oblique, from side well separated, tip rounded, spines little higher than teeth; terminal ridge of propodeum with corners low and rounded; mesosternal tubercle distinct, placed much before coxal slope.

Pepsis (Dinopepsis) theresiae Kreichb.

Black, head and abdomen bluish, legs and antennae black. Fore wings black at base for one-half way to basal vein, beyond a dark yellowish brown, but before hyaline tip it is dark brown; hind wings black at base, hardly as far out as in fore wings, beyond yellowish with a trace of brown, anal lobe largely a brighter yellow, tip hyaline, veins darker than membrane.

Clypeus broadly emarginate below, hairy all over, face narrowed between top of eyes, vertex much elevated and straight across; ocelli in a large depression, laterals nearer to each other than to eyes; a

row of hairs each side near eyes, elsewhere front bare; antennae short, not very heavy, second plus third joints fully equal vertex-width; pronotum strongly shouldered each side, between it is hairy and also on lower front part; pleura hairy; propodeum rather closely striate, above densely clothed with rather short hair, mid-ridge distinct, posterior slope slightly concave, strongly striate, lower sides very hairy, posterior tubercles prominent; mesosternal tubercle low and rounded, abdomen of *grossa* type, shining above, no hair on basal segment, last segment above pitted and with many stout bristles. Legs stout, with stout spines; hind tibiae above with inner row of short, blunt scale-like teeth, and a stout spine near each tooth, an outer row of stout spines; inner spur about one-third of basitarsus; last tarsal joint not curved.

In fore wings the marginal cell is very long, sides parallel, not nearly as wide as second submarginal cell, latter very oblique base and a slightly curved tip; third submarginal about two-thirds as long below as second, narrowed fully one-third above, outer side curved, receiving the second recurrent vein (slightly curved) beyond basal third; in hind wings anal vein ends nearer to margin than to forking.

Male similar, fore wing black more than one-half way to basal vein, hind wings black as far out as fore wings, anal lobe wholly black, beyond yellowish, tip hyaline; the body is more hairy than in female, the front hairy and most of pronotum, longer and denser hair on propodeum; hind tarsi with a low crest, distinct only on basitarsus, lateral ocelli as near eyes as to each other; high mid-ridge on propodeum; abdomen with hair above on the third and segments beyond, venter hairy; the subgenital plate is long and very densely hairy as in others of the subgenus.

Length of fore wings ♀ 40 to 45 mm. ♂ 32 mm.

From Napo River, Ecuador (James Orton about 1870); a pair from Guayaquil, Ecuador, May, June (C. T. Brues) 10 November (Williams), and a female from northwest Trinidad (Ballou, Urich, Fennah).

Pepsis (Dinopepsis) inclyta Lepel.

From Villarica, Paraguay, January, November (Cornell); Chilecitos La Rioja, Argentine, 29 February (Cornell); described from Buenos Aires, Argentine.

The male was treated by Brèthes as male of *P. reaumuri*, but later corrected by him. The mesonotum of female has very fine

parallel striae each side of median groove; the terminal ridge of propodeum broad, with the outer corners low; the mesosternal tubercle small, almost one-third of mesosternal length before coxal-slope; teeth of hind tibia sharp, nearly erect, fairly well separated and in one line, the spines but little higher.

The subgenital plate of the male has a transverse ridge beyond middle, high and parallel to the apical ridge, this middle ridge it higher in middle than on sides, while the apical ridge has a distinct emargination in middle.

Pepsis (Dinopepsis) prudentopolitana Lucas?

A female from Nova Teutonia, Santa Catharina, Brazil, 30 May (Plaumann coll.).

The description does not refer to hairs on legs, but these are rarely mentioned by Lucas or others.

The specimen agrees with description fairly well, and there are but few species wholly black and with non-iridescent wings.

All femora have some rather short curved hairs above and the under side of front femora with hairs curving back toward base of joint as in other species.

The third antennal joint shorter than in other species, much shorter than vertex-width. The mesonotum has many fine striae, those behind curved backward near the groove. Propodeum well separated in two parts, the mid-ridge not large, hairs numerous at turn, posterior slope with coarse ridges, basal part with many ridges. The mesosternal tubercle large, just before coxal slope; terminal ridge with rather high corners. Teeth on hind tibia small, not oblique, but forming one line, well separated, the spines much higher. Third submarginal cell rather short, upper side hardly longer than basal side, outer side at first sloping then turning back toward medius.

Subgenus Deropepsis subgenus nov.

This subgenus is erected for those species of Pepsis in which the vertex is more elevated than usual so that the anterior ocellus is nearly or quite as close to the bases of the antennae as to the crest of the vertex. In the males the subgenital plate is enlarged and provided with carinae, teeth, or small areas of minute hairs. Rarely are there any hair modifications on the third, fourth, or fifth ventral segment of the males. The face usually has three large depressions,

one in middle containing the frontal groove, and one near outer side of each lateral ocellus.

The genotype is *Pepsis frivaldszkyi* Erichson.

Females

1. Fore wings wholly black, darker than brown or castaneous, not pale at tip 2
   Wings more or less rufous, brown castaneous or yellowish, if blackish then pale at tip 8
2. Antennae wholly black, or paler on last joint 3
   Antennae with several joints rufous 5
3. In hind wings the outer part of hind border and the tip pale, hyaline ..... *deuteroleuca*
   Hind wings wholly black 4
4. Outer corners of terminal ridge of propodeum high and pointed; front ocellus nearly as close to antennae as to crest of vertex ..... *elevata*
   Outer corners of terminal ridge low and rounded; front ocellus much closer to crest of vertex ..... *assimilis*
5. Antennae rufous from third joint out 6
   Antennae rufous only on last five or six joints 7
6. Body extremely hairy, pronotal lobes densely long haired .... *xanthocera*
   Body only sparsely hairy, pronotal lobes with little hair .... *glabripennis*
7. Wings nearly uniform black, no yellowish, nor hardly transparent, iridescent bluish ..... *guaranitica*
   Wings rather transparent, and in parts tinged with yellowish, and a yellow streak near costal border in both wings ..... *sickmanni*
8. Wings black with a broad rufous band in middle, antennae black; propodeum with a median furrow ..... *comes*
   No such rufous band 9
9. Antennae more or less rufous 10
   Antennae wholly black, or last joint pale 13
10. Wings largely blackish, but with some irregular streaks of yellowish or tinged with yellowish ..... *sickmanni*
    Not as above 11
11. Antennae with last few joints rufous; tip of wings pale; pronotal shoulder strongly elevated; disc of wings dull rufous; brown border to hind wings ..... *vinipennis*
    Antennae rufous from tip of third joint out 12

12. Wings largely pale blackish, tip plainly paler; hind wings with some yellow near base ..... *lycaste*
Wings largely rufous, dark on tip; head much swollen behind eyes; anterior ocellus as near to base of antennae as to top of vertex ..... *frivaldszkyi*

13. Fore wings brown, hind wings pale yellowish; inner spur nearly one-third of basitarsus ..... *discolor*
Fore wings little, if any, darker than hind wings 14

14. Wings pale on tip, darker before the pale tip, no white or yellowish near base of fore wings, nor along costa ..... *staudingeri*
Wings not paler at tip 15

15. Wings castaneous, more or less hyaline, not darker on tip; anal lobe of hind wings black 16
Wings mostly rufous or yellowish, often dark at base or on tip 17

16. Inner spur of hind tibiae almost one-third of basitarsus; fore wings not darkened at tips ..... *heros*
Inner spur little more than one-fifth of basitarsus; fore wings plainly blackish at tips ..... *hyperion*?

17. Broad black apical border extending over most of third submarginal cell and into much of third discoidal; hind wings with much black, tip hyaline; hind tibiae with only very small teeth, spines are higher; rufous of wing very bright ..... *nitida*
Black at tip not so extensive 18

18. Anal lobe of hind wings entirely black; teeth on hind tibiae low 19
Anal lobe largely pale 20

19. Disc of wings dull yellowish; third submarginal cell but little narrowed above ..... *selvatica*
Disc of wings rather bright rufous or reddish; third submarginal cell much narrowed above ..... *atrata*

20. Base of fore wings black nearly one-half way to basal vein 21
Base of fore wings black for only a very short space, no yellowish nor silvery near base nor along costa; hind wings with a distinct dark border ..... *nutrix*

21. Some silvery or yellowish near base or along costa 22
No silvery nor yellowish near base nor along costa ..... *euterpe*

22. Silvery along costa as well as near base, most of wing dull yellowish; basal tubercles large and long, lateral tubercles small ..... *reaumuri*
Costa not silvery; general surface bright rufous or reddish; basal tubercles low, lateral ones quite high and pointed ..... *flaminia*

Males

The males with a modified subgenital plate are included in a table (pp. 401–404) with other species with modified subgenital plate. The few others may be separated below.

1. Fore wings brown, hind wings much paler, yellowish ..... *discolor*
   Hind wings not noticeably paler than fore wings 2
2. Antennae partly rufous; fore wings wholly black, or black with a rufous spot in middle; fifth ventral segment with a dense row of short, erect hair on each side, fourth segment with some hairs each side not so dense as on the fifth segment ..... *cupripennis*
   Antennae black; both wings with much yellowish or rufous 3
3. Fourth ventral segment with a mass of erect hairs in middle, the outer ones longer and incurved ..... *sinnis*
   Fourth ventral with a tuft each side, tips curving toward each other, fifth segment smooth in middle 4
   Fourth ventral with curved row of seven to nine widely separate hairs, at each end three or four more, along middle of hind margin about ten more, and in front of these, a group of three or four; color of wings like *sinnis* ..... *euterpe*
4. Wings reddish in middle, broadly very dark at ends; hind wings black at tip, base, and along hind border ..... *nitida*
   Wings mostly pale yellowish brown, dull brown beyond closed cells; hind wings largely pale ..... *nutrix*

Pepsis (Deropepsis) frivaldszkyi Erichs.

Both sexes from northwest part of Trinidad; sources of Rio Essequibo, British Guiana (J. Ogilvie).

This species has the characters of the genus in full development. The anterior ocellus is as near end of frontal groove as to crest of vertex, lateral ocelli twice as near each other as to eyes; clypeus broadly arcuate below; propodeum coarsely ridged, no distinct midridge, and basal and lateral tubercles very small, the latter higher; terminal ridge with low, rounded corners; mesosternal tubercle small and low, a little before coxal slope; teeth on hind tibiae small and well separated, the spines little longer. Head and thorax not very hairy, propodeum with long hair, rather dense near turn.

Pepsis (Deropepsis) heros Fabr.

From Rio de Janeiro, Brazil (Thayer Exped.) and Rio Jatun, Yacu, Oriente, Ecuador (MacIntyre). Recorded from Obidos, Iquitos, and Yurimaguas, Amazonas, Brazil.

Clypeus broadly arcuate below; lateral ocelli twice as near each other as to eyes, front ocellus about half way from vertex-crest to base of antennae, metanotum with only trace of fine striae; propodeum with posterior slope ridged and more sloping than in *atrata*; mid-ridge fairly broad, sometimes higher in middle; basal and lateral tubercles very small; terminal ridge with low, rounded corners.

Pepsis (Deropepsis) hyperion Mocs.

Described from Brazil.

I have identified a species of Gigantopepsis as probably *hyperion*; if it is wrong then *hyperion* doubtless belongs here, separated from *heros* by less broad wings, the tips broadly blackish, fading gradually, by the longer third submarginal cell, and by shorter inner spur.

Pepsis (Deropepsis) guaranitica Brèthes

From Province Sara and Santa Cruz, Bolivia (Steinbach).

Clypeus arcuate in middle below; anterior ocellus one-third nearer vertex than antennae; metanotum with fine faint ridges; corners of terminal ridge quite high, but tip rounded; mid-ridge moderately long, highest in middle; mesosternal tubercle fairly prominent, at base of slope; teeth on hind tibiae low and well separated, spines as high or higher.

Pepsis (Deropepsis) glabripennis Lucas

Females from Nova Teutonia, St. Catharina, Brazil, January, and Pastorea, Paraguay (Donald Wees). Described from Porto Allegre, Brazil.

P. heterochroa Brèthes seems to be near and possibly the same. Clypeus angulate in middle below; front ocellus one-third nearer to vertex ridge; metanotum with few short ridges; corners of terminal ridge fairly high, but rounded; mid-ridge very low and long; mesosternal tubercle quite strong, at base of slope; teeth on hind tibiae small, well separated, spines higher.

Pepsis (Deropepsis) cupripennis Taschb.

Males from Villarica, Paraguay (Schade); Iguazu Falls, Argentina, 20 to 22 January (Harris coll., Cornell Exped.); Teffe, Amazon, Brazil, 24 October (Bassler coll. Am. M. N. H.).

Typically with yellowish spot in middle of wings, this is reduced until the wings are almost entirely deep black; the ventral tufts are characteristic.

Pepsis (Deropepsis) sickmanni Mocs.

Females from Numducu, Paraguay (D. Wees); Villarica, Paraguay, May, December (Cornell); Canto Gallo, Brazil (Dr. Teuscher, Thayer Exped.); Maracajú, Matto Grosso, Brazil, April-May (Fairchild).

Clypeus arcuate below; anterior ocellus about as near vertex as to base of antennae, lateral ocelli about twice as far from eyes as from each other; mid-ridge moderately broad, evenly rounded above; neither basal nor lateral tubercles very large; mesosternal tubercle rather small, pointed, at base of coxal slope; terminal ridge with low, but broad corners; teeth of hind tibiae rather low, mostly erect, blunt, fairly well separated, spines higher, posterior slope of propodeum very steep, hardly less than *elevata*; little hair on venter; usually a yellow streak in upper part of first submarginal cell.

I think this is the female of *cupripennis* as suggested by Lucas.

Pepsis (Deropepsis) lycaste spec. nov.

Female. Black, with a bluish sheen, especially strong on abdomen; legs dull black, but bluish or violet on parts of femora and tibiae; antennae black on first, second, and basal half of third joints beyond brownish rufous; fore wings yellowish brown, tips pale (not white) on outer half of apical field, hind wings paler, more yellowish subhyaline, veins mostly rufous, hind wings at base with a short, subcostal streak of yellow and a broader, almost golden one, just in front of the black anal lobe. Clypeus broadly arcuate below, with some bristles in middle toward front, vertex and back of head swollen but not as strongly as in *frivaldszkyi*, the anterior ocellus about half way from antennae to crest of vertex. Head with some hair, but not dense; second plus third antennal joints not quite equal interocular space; hind ocelli one and one-half times nearer each other than to eyes.

Pronotum short above, sloping in front, with a few long hairs on sides and on top. Metanotum hairy; propodeum with many long erect hairs, and a short, dense, erect black pubescence, ridges irregular, a distinct, but rather low mid-ridge, posterior slope steep, flattened, coarsely ridged straight across; terminal ridge low, with low, rounded ends, basal tubercles large, and with two coarse ridges, lateral tubercles very small.

First segment of abdomen rather broad at base, abdomen plainly broadest at middle of second segment, last two or three with hairs, bristly toward tip; venter moderately hairy on last segment, few elsewhere. Legs not very long, comb on front basitarsus of thick spines, hind tibiae above with an outer row of very small, obliquely set teeth, some short, stout spines nearby, inner spur not one-third of basitarsus.

In fore wings abscissa two much longer than three, latter about equal to base of third submarginal cell, outer side much bent back below middle, almost angulate, third cell much broadened below at end of the second recurrent vein which is oblique and slightly sinuous, and ends two-fifths of way out; basal vein ends before transverse hardly one-half the length of transverse, upper side of second submedian cell about twice as long as transverse vein.

Length of fore wings 34 mm.

Type from Santa Cruz, Bolivia (Steinbach) M. C. Z. no. 27201, paratype from Buenavista, near Santa Cruz, Bolivia (Steinbach). The antennae are much more rufous than *pertyi*, to which it is probably related.

Pepsis (Deropepsis) comes spec. nov.

Body and legs black, more or less blue on body above and on femora and tibiae; antennae black, last four or five joints rufous above, six below; wings deep black, with a slight bluish iridescence, in fore wings with a broad rufous band, placed much as in *P. completa* but the inner edge in submedian and anal cells being scarcely before end of basal vein, the band slopes a little outward the lower base further out than upper base, but ends rather sharply defined; the band does not reach costal margin, the costal area being black; the band in hind wings is more yellowish, its inner end corresponding to inner end of band on fore wing, its front part extends further out, and behind it does not reach hind margin, the end of anal vein being about in middle of the spot.

The body is about as hairy as in *completa*, except that the tip of abdomen is not so hairy. Vertex higher than *completa*. The clypeus is angulate in middle below, hairy on lower part; from in front the vertex is arched above the eyes, and the lateral ocelli in line with top of eyes, and plainly nearer to each other than to eyes, a transverse depression back of them, face moderately short, little narrowed above; antennae rather short, second plus third antennal joints nearly equal vertex-width, few hairs in middle of front; pronotum

almost vertical in front, shoulders fairly prominent; little hair on pleura; propodeum with a low but broad mid-ridge, coarsely ridged, posterior part evenly sloping, with finer scarcely broken ridges; stigmal tubercles rather low, laterals higher; mesosternal tubercle fairly sharp, but not projecting laterally; terminal ridge with corners high and nearly acute.

Abdomen stouter than in *completa*, and legs hardly as slender; front tibia spiny and bristly all around, hardly equal to width of head; hind tibiae with a row of small, blunt teeth above, and longer spines; inner spur fully one-third of basitarsus. In fore wings marginal cell more than one-half its length from tip, base oblique, not so broad as second submarginal cell, latter nearly three times as long as broad, base very oblique, tip evenly rounded; third submarginal cell about two-thirds of second above and below, receiving the second recurrent (oblique, scarcely curved) at end of basal two-fifths, outer side rather evenly rounded, sloping but little; in hind wings anal vein ends half way to margin.

Length of fore wing 25 mm., width 7 mm.

A female from Belem, Para, Brazil, (L. E. Martorelli). Type M. C. Z. no. 26694; also from Belem, in June (F. X. Williams).

Pepsis (Deropepsis) assimilis spec. nov.

In general appearance closely similar to *P. elevata*, the propodeum being about the same, the basal part nearly level, strongly ridged, densely haired, the short hairs particularly dense at the turn where they obscure the short mid-ridge; posterior slope fully as steep as in *elevata*, nearly flat across, with ridges and dense long hair.

The body, wings, antennae, and legs are black, the body mostly blue sheen; the wings with a rather dull bluish iridescence; in anal cell of fore wings near base is a small yellowish spot, most noticeable from behind; the legs are blue to violet. Head rather smaller than in *elevata*; clypeus a little less strongly arcuate on margin, short on upper part. Antennae have second plus third joints fully equal to vertex-width, latter not quite as high as in *elevata*, so the front ocellus is plainly nearer crest of vertex than to antennae; vertex not as broad as *elevata*, and the lateral ocelli nearer to eyes than in *elevata*. Hairs on prothorax and mesothorax above as in *elevata*, but below they are longer; the mesosternal tubercle rather higher than in *elevata*, but the hair there fully three times as high as the tubercle.

The terminal ridge has only low rounded corners, in contrast with the high acute corners of *elevata*.

Abdomen much like *elevata*, but first segment is not flattened in front; third and fourth segments above with a few hairs near hind border. Legs much as in *elevata*, but the hind tibiae with teeth more erect and pointed, and more separated; inner spur of hind tibia almost one-third of basitarsus; claws slender, tooth one-third way from base.

In the fore wings the oblique hyaline line from base of stigma is distinct; the basal vein ends fully one-half length of transverse before transverse, much further than in *elevata*; the base of the third submarginal cell is angulate in middle and with a stub of a spur, the lower part not bent back as far as in *elevata*, the outer side of third cell has a long slope, two-thirds of length then curving back to medius.

Length of fore wing 38 mm.

One female from Cumuto, Trinidad, May (Darlington). Type M. C. Z. no. 27347.

Pepsis (Deropepsis) elevata Fabr.

From Cumoto, Trinidad, May (Darlington); Northwest part of Trinidad (Ballou, Urich, Fennah); Mayaro Bay, Trinidad, 4 December (N. A. Weber); Tumatumari, British Guiana, July (F. X. Williams); Kartabo, 23 January, 13 June, and Bartica district, both British Guiana, recorded from Para, Obidos, Chapada, Corumba, Uacarizal, Brazil, and Cayenne.

Clypeus broadly arcuate below; anterior ocellus about one-half way between crest of vertex and base of antennae, lateral ocelli about twice as far from eyes as from each other; mid-ridge short, fairly high, dense hair around it; posterior slope steep, with short dense hair; basal tubercles low, broad, lateral tubercles higher; corners of terminal ridge very high and almost acute; teeth on hind tibiae small, widely separate, spines much higher; ventral groove before middle of second segment; little hair on venter.

Pepsis (Deropepsis) atrata Lepel. (Fig. 8)

Females from Mt. Duida, Venezuela, 2 November (Tate coll.) and Huyuwini River, British Guiana, 22 November (Hassler coll.) A. M. N. H. Head and ocelli about as in *frivaldszkyi*; mesonotum with few and short obsolete striae; propodeum with the ridges on basal part sometimes angled in middle behind, mid-ridge fairly high, sometimes two points; basal and lateral tubercles quite large, the laterals high; corners of terminal ridge low and rounded; teeth of hind tibiae well spaced, small, the spines higher; mesosternal tubercle inconspicuous.

A male from Mt. Duida, Venezuela, 2 November (Tate coll.) A. M. N. H.

Body black, abdomen with blue to purple iridescence, legs and antennae black; fore wings ferruginous, but stained with brown beyond middle, extreme tip whitish, not reaching closed cells except at end of marginal cell, tip of marginal cell with a dark spot continued back over ends of cells as an indistinct band; base for nearly one-third way to basal vein deep black, also subcostal vein, other veins pale rufous; hind wings similar to fore wings, but posterior margin has a dark brown border, extreme tip very narrowly pale.

Clypeus plainly emarginate below in middle, surface quite strongly punctured, face narrowed above, vertex extending much above eyes, anterior ocellus a little nearer vertex ridge than to eyes, little hair on head or thorax; pronotum nearly vertical in front, arcuate behind, shoulders not prominent. Propodeum well separated by a low but broad mid-ridge, basal part with fairly coarse ridges, hardly distinct laterally, basal tubercles very low, lateral tubercles small but quite high; entire propodeum very hairy, those near ridge high and dense, those on basal part low, curved and almost depressed. Abdomen somewhat depressed, basal segment fully as long as broad behind, and only slightly arched seen from side. Hind basitarsi compressed, but fringe low not concealing the spines, hind tibia longer than width of fore wing, the hair above not covering the spines.

In fore wings the second submarginal cell is long, the second abscissa fully two and one-half times as long as abscissa three, latter not two-thirds of base of third cell, latter slopes back below, but hardly curved, lower side more than twice upper, outer side curved and sloping, second recurrent (straight) ends scarcely beyond basal third.

No hair modifications on venter; the subgenital plate is semicircular, but angled a bit at middle with a low rim, half-way to base is a cross-ridge nearly parallel to apical rim, but a little angulate in middle and here it is a little higher.

Length of fore wings 32 mm.

Pepsis (Deropepsis) vinipennis Pack. (Fig. 9)

Described from a female taken on "route along Napo and Marañon rivers" (J. Orton.) Type M. C. Z. no. 495. A female from Moyobamba Region, Peru, 8 January, (Bassler) Amer. Mus. Nat. Hist., agrees with the type. *P. erythroptera* Mocsary from Iquitos is a synonym.

The main part of wings is quite bright reddish, the costal streak black, extreme base of both pairs black for a short distance; in hind wings the hind margin has a dark border; the dark between the pale tip and the red is quite broad in both pairs, but fades off each side, nowhere sharply marked. The last two or three joints of antennae are rufous.

The head is rather small, the clypeus quite deeply arcuate below, second plus third antennal joints equal to vertex-width. Propodeum with a moderately long and high mid-ridge, the lateral tubercles prominent, the two connected by a ridge, the second behind mid-ridge; others on posterior slope mostly distinct in middle area. Hind tibiae with small triangular teeth, mostly widely separated. Mesosternal tubercle fairly large, projecting below, not visible from above. The third submarginal has the upper side scarcely one-half of the basal side, latter not curved back at lower end, second recurrent ends at middle of cell which is angulate there.

Pepsis (Deropepsis) staudingeri Enderlein

This was based on a male; the female is very similar but larger, the tip of fore wings distinctly pale and before it a darker band.

Specimens are from Mendoza (C. S. Reed) and La Rioja (Giacomelli, Cockerell) both Argentina; San Mathias Bay, Patagonia (Hassler Exped.); Pelotas, Brazil.

Clypeus broadly arcuate below; lateral ocelli not quite twice as far from eyes as from each other; metanotum with a few striae in front; mesosternal tubercle very low and small, near base of slope; basal tubercles broad and low, laterals low and rounded; mid-ridge very broad and moderately low, the hair here very dense.

Teeth on hind tibiae very low and small, well separated, the spines higher.

In the male the ventral groove is distinct and placed a little behind the basal third; the subgenital plate has two parallel rather high cross-ridges, one at tip; there is but little hair on venter, and that short; the hair-crest on hind tibia is very low, most of the spines showing.

Pepsis (Deropepsis) selvatica Brèthes

A female from Satipo, Peru, 500 m. from Dr. Weyrauch. Clypeus arcuate below; anterior ocellus only a little nearer if any, to vertex; lateral ocelli one and one-half times as far from eyes as from each

other; mid-ridge moderately broad, not very high; posterior slope not steep, ridged, with long hair; corners of terminal ridge low, rounded; mesosternal tubercle very small, at base of slope; basal tubercle broad and very low, lateral tubercle high and prominent; teeth on hind tibiae very small, sloping, mostly widely separated, the spines heavy and fully twice as high, bristles also very long; ventral groove before middle, little curved.

Pepsis (Deropepsis) nutrix Brèthes

Females from Cordova (Davis) and Cruz de Piedra, Mendoza, 4 March (Cornell Exped.), both Argentine, and San Mathias Bay, Patagonia (Hassler Exped.). Clypeus lightly arcuate in middle below; anterior ocellus a little nearer to vertex than to base of antennae, lateral ocelli fully one and one-half times as far from eyes as from each other; mid-ridge broad, low, emarginate in middle; posterior slope not steep, hairy, ridged not coarsely; corners of terminal ridge low; mesosternal tubercle hardly more than an angle; teeth on hind tibiae small but sharp-pointed, narrow at base, well separated, nearly erect, spines higher; propodeum with very long and dense hair; front femora with some hairs below. The male is colored as female; the ventral groove distinct; the fourth ventral has tufts much like those of *limbata*, but hardly as high; hair on second and third segments much higher than in *limbata*; subgenital plate slender, narrowed at base, rounded at tip.

Pepsis (Deropepsis) sinnis Lucas

Described from a male from Montevideo, Uruguay, I have seen males from Urucum, Corumbá, Brazil, 23 to 29 December (Cornell).

The fourth ventral segment has a group of erect hairs over the middle of the segment, the end hairs but little incurved; the subgenital plate tapers only a little toward base, the tip nearly truncate; the ventral groove is only a broad shallow depression; the terminal ridge has rather high corners; the basal tubercles long and low, the lateral ones extend backward, but not outward, also low.

Pepsis (Deropepsis) euterpe Brèthes (Figs. 10–12)

In general much like *nutrix*; the mid-ridge is low in rather dense long hair; corners of terminal ridge rather high, almost pointed; both basal and lateral tubercles quite large and nearly pointed; teeth on

hind tibiae very low and mostly well separated, spines much higher; ventral groove a little before middle of second ventral segment.

The male closely resembles *sinnis* in size and color. The subgenital is very much broader, especially at tip which is truncate or almost emarginate in middle; the fourth ventral has the hairs greatly reduced in numbers from the median mass of *sinnis*; across the middle of front is a curved row of seven to nine widely separated long hairs, at each end of the curve are a few more, two to four, along the middle of hind border of the segment is a short row, partly two deep, of about a dozen hairs, in front of this a group of two to four or five, sometimes in a line; the third ventral segment is almost devoid of hair, in *sinnis* with numerous long hairs.

Many specimens of both sexes from Nova Teutonia, St. Catharina, Brazil, in November, December, and January, taken by Plaumann; described from Tucuman, Argentine.

Pepsis (Deropepsis) reaumuri Dahlbom

Both sexes from Chilecito, La Rioja, Argentina, 29 February, 4 March (Cornell Exped.); La Rioja, Argentine, (Giacomelli and Cockerell); Mendoza, Argentina, 14 March (Cornell Exped.).

The male of *pampeana* Brèthes is the male of *reaumuri*, the female doubtless goes in *Nannopepsis*.

Clypeus lightly arcuate below; anterior ocellus only a little nearer crest of vertex, lateral ocelli almost twice as far from eyes as from each other; mid-ridge broad and low, almost hidden in dense hair; posterior slope very steep, ridged, densely long-haired; mesosternal tubercle very low; corners of terminal ridge rounded; teeth on hind tibiae low, rather widely separated, the spines much higher.

Pepsis (Deropepsis) flaminia Brèthes

Both sexes from La Paz, Argentine, 18 December (Joergensen); Villarica, Paraguay, December, January (Cornell); Santa Cruz, Bolivia (Steinbach).

The clypeus lightly arcuate below; anterior ocellus about one-half way between vertex and base of antennae, lateral ocelli one and one-half times as far from eyes as from each other; mid-ridge low, propodeum with much short hair, dense at the turn, posterior slope ridged; terminal ridge with low, obtuse corners; basal tubercles low, laterals quite high and pointed; teeth on hind tibiae close in line, slightly sloping, low, the spines only a little, if any, higher.

Pepsis (Deropepsis) nitida Lepel.

Males and females from Cordova (Davis); La Rioja (Cockerell and Giacomelli); Paso de l. Libres, Corrientes, 12 to 14 January (Cornell Exped.), all Argentina, also La Rioja, Argentina (Amer. Mus. Nat. Hist.); San Mathias Bay, Patagonia (Hassler Exped.). *P. lampas* Lucas is a synonym.

Clypeus arcuate to almost angulate below, anterior ocellus plainly nearer to crest of vertex than to base of antennae; laterals much nearer each other than to eyes; mid-ridge low and hidden by dense hair; posterior slope quite steep, rather finely or obsoletely ridged; terminal ridge with low, almost square corners; mesosternal tubercle distinct, at base of slope; hind tibiae with low, sloping teeth, little separated, the spines much higher and the bristles numerous and higher with their tips bent back.

Pepsis (Deropepsis) nitida var. lassonis Lucas

Male and female from Abancay, 2400 m., December, and Ninabamba (near Ayacicho) 1900 m., December, both Peru and taken by Dr. Weyrauch; Villa Rica, Paraguay, December, January (Cornell).

Pepsis (Deropepsis) discolor Taschb.

From Sao Paulo, Brazil, December (A. G. Silva); Villarica, Paraguay, January, April, September (Cornell); Tacuru-Pacu, Paraguay 2 to 7 April (Donald Wees); Maracajú, Matto Grosso, Brazil, April-May (Fairchild); Campinas, Brazil, March, October (F. X. Williams). *P. diversipennis* Mocs. appears to be a synonym as noted by others.

Clypeus slightly angulate in middle below; anterior ocellus plainly nearer to vertex crest than to base of antennae, lateral ocelli fully one and one-half times as far from eyes as from each other; but little hair on vertex and pronotum; mid-ridge very low and broad; hair on basal part of propodeum rather short and not dense; posterior slope moderately steep, with cross-ridges, some hair on sides; corners of terminal ridge low and rounded; mesosternal tubercle small, rounded, at base of coxal slope; ventral groove before middle; teeth on hind tibiae small, sloping, fairly sharp-pointed, and quite evenly spaced.

The male is similar in color, the clypeus more angulate in middle below; corners of terminal ridge higher than in female; the hind tibiae have a very low hair crest, the spines projecting above it; in both sexes the transverse is more or less oblique. There is no distinct ventral groove, only slight transverse depression.

Pepsis (Deropepsis) persephone Schrottky

This was described from a female from Sao Paulo. Several males agree fairly well in coloration and structure from Villarica, Paraguay, January (Schade, Cornell coll.) and Chapada, Brazil (H. H. Smith).

Both wings nearly evenly pale yellowish brown to just beyond the cells, from there hyaline; the third submarginal cell quite long, tip almost angulate in middle, second recurrent received only a little beyond basal third.

Clypeus angulate in middle below; anterior ocellus about halfway from crest of vertex to base of antennae, lateral ocelli almost twice as far from eyes as from each other; head and pronotum with little hair; propodeum with rather short hair above; mid-ridge high and short; both basal and lateral tubercles low; posterior slope from side incurved, moderately hairy on sides, some obsolete ridges in middle; corners of terminal ridge moderate, rounded; mesosternal tubercle only an angle at base of slope; hind tibiae with fairly high hair-crest, not obscuring the spines on basal part, but beyond they are covered; ventral groove before basal third of second segment; in the fore wing the transverse vein not oblique. The subgenital plate is similar to that of *defecta* but not as broad at base, and the hairy triangle is smaller and has straighter sides.

Pepsis (Deropepsis) defecta Taschb. (Fig. 17)

Male from Jujuy, Argentina, 11 February (Cornell Exped.).

Clypeus lightly arcuate below; anterior ocellus as near base of antennae as crest of vertex, lateral ocelli one and one-half times as far from eyes as from each other; mid-ridge high, prominent; basal tubercle quite large rounded; lateral tubercles small, conical; corners of terminal ridge small and rounded; mesosternal tubercle large, high, rounded, at base of coxal slope; propodeum densely long-haired, posterior slope nearly vertical, sides hairy, middle with five cross-ridges; hind tibia with a fairly high hair crest, the spines not projecting above it. The ventral groove is distinct and placed a little behind basal third; the subgenital plate broad, polished laterally at base and with a large triangular area occupying the part beyond.

Several species listed under the restricted Pepsis may later be put in Deropepsis, principally the large species with black iridescent wings; also *ataraqua*, *smaragdina*, *helvicornis*, and *cyanoptera*.

Three have been included in the table, which are here placed elsewhere, since it is possible that they belong here; these are *deuteroleuca*, *xanthocera*, and *hyperion*.

Subgenus Nannopepsis subgenus nov.

Most easily recognized by the last ventral segment being concave, and fringed laterally. The last dorsal segment has erect fine hair not the bristly, sloping ones of normal Pepsis, similar to Cirripepsis. The pleura and femora have very distinct, sometimes coarse punctures. The mid and hind femora have hairs or bristles, the front femora with shorter and finer hairs. The pronotum and propodeum are both almost without hair; the abdomen is usually smooth and shining; the clypeus is hairy to base; the propodeum has a few coarse ridges, and the lateral tubercles are very small.

The species are small and have moderately short legs.

Type *Pepsis pruinosa* Mocs.

Besides the species tabulated below, *P. cordata* and *P. dorsata* of Brèthes belong in the genus. Lucas, in his description of *Pepsis pruinosa*, noted the concave last segment of the abdomen, and also Brèthes for the female of *pampeana*.

Table of species

1. Fore and hind wing largely reddish, a broad dark apical border; at base of fore wing is a patch of yellowish ..... *pampeana*
   Wings more largely black, especially the hind pair 2
2. Basal half of hind wings yellowish 3
   Hind wings almost wholly black 4
3. Hind wings largely yellowish, apical and hind border black ..... *aretheas*
   Hind wing with hardly more than basal half yellowish ..... *concava*
4. At most a little reddish in basal part of fore wing along the upper side of medius ..... *consors*
   Much more rufous or yellowish in fore wings 5
5. The pale forms a broad band across near base ..... *joergenseni*
   The pale is in two longitudinal streaks 6
6. The posterior streak is interrupted before the second branch of medius ..... *interrupta*
   The streaks are not interrupted; and of a reddish color ..... *pruinosa*

Pepsis (Nannopepsis) pruinosa Mocs.

Several females from Santa Cruz, Bolivia (Steinbach) and Buena Vista, near Santa Cruz (also Steinbach).

A male which has both wings black except in the fore wing there is some pale in the first submarginal cell, first discoidal, and the second

submedian, the base before this pale is jet black, beyond more brown. Antennae rather long and thick; the fourth ventral segment has a curved band of hair across upper half, the outer hairs longer and incurved; hairs on femora very short; the pronotum with much longer hair than in female.

Pepsis (Nannopepsis) concava Brèthes

From Villarica, Paraguay (Schade). If one considers that the basal and apical parts are differently colored (which is a fact), the species can be run out in Brèthes' tables to *P. cordata,* and seems to agree except there is no mention of bristles on the femora.

Pepsis (Nannopepsis) joergenseni Brèthes

A female from Province Sara, Bolivia (Steinbach). The yellow band is just beyond the narrow jet black base; the third submarginal is short, both ends curved, but little longer below than above, and the second recurrent ends about two-fifths way out. The hind tibiae have small teeth and the stout spines fully twice as high; the femora are as with allied forms, the hairs on front femora rather longer than in *N. concava.*

Pepsis (Nannopepsis) aretheas Brèthes

A female from Villarica, Paraguay (Schade) (Cornell). The pale is more extensive and the black less, otherwise much like *concava.*

Pepsis (Nannopepsis) pampeana Brèthes

From Tofo, Chile, (Hallinan coll. Amer. Mus. Nat. Hist.). Described from Jujuy, Argentina.

It has considerable resemblance to *Pepsis nitida.*

Nannopepsis consors spec. nov.

♀ Body black; abdomen shining, showing more or less blue according to light; antennae and legs black, both pairs of wings black or blackish with some bluish iridescence; the hind pair paler on apical third.

Structure very similar to *pruinosa,* the clypeus broadly concave below, head, thorax, and propodeum with few and very short hairs; propodeum coarsely ridged, about ten before turn, no mid-ridge,

stigmal tubercle low and rounded, lateral tubercle scarcely distinct; mesosternal tubercle distinct and at base of coxal slope; mesopleura plainly punctate; mid and hind femora with stiff, appressed bristles; hind tibiae with small teeth, the stout spines twice as high; inner spur of hind tibia about 2/5 of basitarsus. In fore wing the venation about as in *pruinosa*, the third submarginal cell as in *pruinosa*, the second recurrent vein ends only a little before the middle of the cell.

Length of fore wing 21 mm.

From Santa Cruz, Bolivia (Steinbach) Type, M. C. Z. 26201 and Buena Vista near Santa Cruz, Bolivia (Steinbach Cornell).

Pepsis (Nannopepsis) interrupta spec. nov.

♀ In general very similar to *pruinosa* and *concava*; the pale being mostly yellowish, that along costa and that before the second branch of medius being mostly silvery; the basal cell in certain views is also silvery. The hind wings wholly dark.

Body black, almost bare, few short hairs on head above and at sides of pronotum; abdomen smooth and shining; pleura more or less blue; antennae black. The mid and hind femora have the stiff bristles as in allied forms, and the hind tibiae have very small teeth above, the stout spines and bristles are very much longer; inner spur of hind tibia fully one-third of basitarsus.

In the fore wing the first submarginal cell is pale in front, black behind, the pale stripe behind medius is broadly interrupted at the first branch of medius by black. The third submarginal cell as in *P. pruinosa*.

Length of fore wing 21 mm. to 25 mm.

From Maracajú, Matto Grosso, Brazil, April-May (Fairchild). Type M. C. Z. no. 26200.

Subgenus Cirripepsis subgenus nov.

This differs from other Pepsis and agrees with Nannopepsis in having the hair on last dorsal segment erect and fine; it differs from Nannopepsis in the convex surface of the last ventral segment. The species known have the femora more or less hairy, and the teeth on hind tibia are very small or lacking. Except for three species the wings are a uniform black, no pale bases nor dark borders. The femora are more or less hairy as well as coxae and pleura; the propodeum is fairly densely long-haired; no hair on base of abdomen.

Type is *Pepsis planifrons* Lucas.

Synopsis of species

1. Fore wings with a reddish or yellowish mark besides the dot in base of first discoidal cell 2
   Fore wings dark, without paler mark 4

2. Basal half of fore wings largely yellowish; about six apical joints of antennae yellowish ..... *astioles*
   The pale spot is much smaller 3

3. The spot is a short streak near middle of costal margin ..... *andina*
   The spot is on or near basal vein and veins near by ..... *aurimacula*

4. Distinct hairs on third antennal joint as well as on first joint; no teeth on hind tibiae; pronotal lobes hairy; mandibles long and slender, curved near tips 5
   No hairs on third antennal joint and rarely on first, usually small teeth on hind tibiae 6

5. With bluish sheen on body and wings; second recurrent vein much before middle of third submarginal cell ..... *planifrons*
   With greenish sheen, especially on thorax; second recurrent ends close to middle of third submarginal cell ..... *villosa*

6. Entire venter behind groove closely punctate and with many long hairs 7
   Only last ventral segment with many long hairs 8

7. A distinct mid-ridge, venter very densely punctate and hairy, the third and fourth punctate close to hind margin; hind tibiae with a row of small sharp-pointed teeth; third abscissa much shorter than second ..... *hirtiventris*
   No distinct mid-ridge, venter not so densely punctate, and a space along hind border of segment devoid of punctures; hind tibiae with no row of teeth, but only some partly developed ones or small tubercles at base of bristles; third abscissa about equal second ..... *vicina*

8. Propodeum with a distinct impressed line from base to tip, no mid-ridge; the striae in middle of front part very fine; femora not hairy ..... *purpurea*
   No impressed median line from base to tip 9

9. Femora without long hairs, nor any on posterior slope of propodeum; about apical half of antennae rufous 10
   Femora and posterior slope of propodeum with long hairs 11

10. Third antennal joint equal to width of vertex; lateral tubercles rather large ..... *laconia*
    Third antennal joint not equal to vertex-width; lateral tubercles small ..... *sagana*

11. The rufous on antennae begins near base of third joint; pronotum nearly vertical in front ..... *moesta*
    At least four antennal joints black; pronotum slightly sloping in front 12

12. Fore wings about 24 mm.; posterior slope of propodeum with a median groove, striae very fine; third joint of antennae not equal first plus second ..... *orestes*
    Fore wings about 16 to 18 mm.; posterior slope of propodeum without median groove; third joint of antennae longer than first plus second ..... *ilione*

Pepsis (Cirripepsis) aurimacula Mocs.

Specimens from Artux Alvini, Sao Paulo (J. Lane), Matto Grosso, and Sao Paulo, Brazil. Lucas says antennae pale from fourth joint out. Those I have seen have three to four and one-half joints rufous above, and four to five below. One from Matto Grosso has a larger spot like his variety *guttata*, but it is not green. Of four from Sao Paulo two have the pale mark small, one about as his *guttata* and one is intermediate in size. There are no teeth on hind tibiae, and rather short hair on coxae and femora.

Pepsis (Cirripepsis) andina Brèthes

A female from Ninabamba, Peru, 1900 m., Dec. (Weyrauch). It agrees well with Brèthes' description and figure. The hind femora have very low sloping teeth, with the spines higher and the stout bristles bent toward tip of joint.

Pepsis (Cirripepsis) astioles spec. nov.

Black, more or less blue iridescence on body above and femora especially blue on abdomen; antennae with last six segments yellowish; fore wings dark brown, veins black, a large yellowish area on basal half, occupying all of first and second discoidal cells; and base of third, also most of first submarginal cell and extending somewhat into basal cell, but extreme base black, extending out in three fingers about to basal vein; hind wings rather paler brown, with a pale yellowish streak along middle of costa.

Clypeus deeply indented in middle, and the lower margin each side convex; face broader than high; vertex nearly straight across; ocelli in a fairly broad triangle, hind ones almost twice as near each

other as to eyes; antennae rather short, hardly reaching to base of propodeum, second plus third joints not equal to vertex-width; pronotum vertical in front, hardly any above, the shoulders very prominent ridges, middle angulate behind; propodeum with few, but distinct ridges, some broken or irregular, a fair-sized median ridge, lateral tubercles fairly prominent, the stigmal tubercles much larger; posterior slope scarcely striate, except on sides; mesosternal tubercle prominent, and quite sharp.

Abdomen similar to allies, very fine hair at apical segment above and below, few hairs elsewhere on venter; legs of moderate length, hind tibia above with few and very broad and low blunt teeth, widely separated, the spines very much longer, inner spur about one-third of basitarsus, claws with a small sharp tooth.

In fore wings the marginal cell slender, sides nearly parallel, end rounded, more than one-half its length from wing-tip, as broad as second submarginal cell, latter more than twice as long below as broad, base strongly oblique, top hardly three-fifths of lower side; third submarginal cell half as long above as the lower side of second, little longer below, but much broader, the second recurrent (nearly straight) pulls it down in an angle, outer side bent in middle; in hind wings the anal ends well beyond forking, but not halfway to margin.

Length of fore wings 18 mm.

A female from Vista Nieve, San Lorenzo Mt., Colombia, 21 December (J. Bequaert). Type M. C. Z. no. 21724.

Related to *aurimacula* with the small spots of that species greatly enlarged; clypeus more deeply indented, and vertex broader.

P. (Cirripepsis) planifrons Lucas

From Santa Cruz, Bolivia (Steinbach). Two females, fore wings from 20 to 23 mm., the fore wings are more brilliantly blue than in *villosa* but the specimens of the latter are much older. There are some hairs on femora and tibiae.

P. (Cirripepsis) villosa Brèthes

From Rio de Janeiro, Brazil (Thayer Exped.). Two females, fore wings from 18 mm. to 24 mm. long. It is little different from *planifrons* as shown in table of species, and with more specimens they may be but one species.

Pepsis (Cirripepsis) hirtiventris spec. nov.

Body black, with bluish pubescence, on head in some views green or violet; antennae and legs black, antennae with about last six joints rufous. Wings dull blackish, not deep black. Clypeus slightly concave below, a few hairs on lower part, front and vertex with almost no hairs, a few by eyes; lateral ocelli fully twice as far from eyes as from each other; third antennal joint not quite equal to vertex-width. Thorax, pleura, and propodeum practically devoid of hairs; mesosternal tubercle quite prominent; propodeum with a low mid-ridge, about twelve ridges before it, posterior slope with finer ridges, stigmal tubercle rather large, lateral much smaller. Abdomen above has the dense fine hair on last segment above, below the entire venter behind the groove is covered with punctures and long sloping hair, no hair on under side of first segment; all femora with scattered short hairs none half as long as width of joint. Hind tibia with many small well-separated teeth above, the spines and bristles much longer, inner spur about one-third of basitarsus.

Fore wings moderately slender; end of first discoidal cell longer than base of the second submarginal cell; third submarginal cell much as in Lucas' figure 183.

Length of fore wing 22 to 25 mm.

From Iquitos San Rogue, Peru, June (Klug). Type Cornell Univ., paratype from Mishuyacu, Peru, 15 Aug., M. C. Z. 26196; also paratypes from Iquitos, Peru (H. Bassler) and Achinamiza, 28 August, 19 September (H Bassler) in Amer. Mus. Nat. Hist.

This may be the *mapirensis* Lucas; however there is no green on body; the head is more flattened than in *vicina*, fully as much as in *planifrons*; the venter is more than twice as hairy as in *vicina*, and Lucas does not mention the numerous prominent punctures on the venter.

Pepsis (Cirripepsis) vicina Lucas

Females from Kartabo 15 March, 28 May; Kalacoon, 14 April, both in British Guiana, Sint Barbara Pln., Surinam River, Surinam, and Caripito, Venezuela, 4 August.

The teeth on hind tibiae are scarcely noticeable; the venter has hairs on all segments, but not so densely hairy as in *hirtiventris*; it is readily separated from *orestes*, which also has hairs on second ventral, by the weak, indistinct teeth on hind femora and lack of mid ridge on propodeum; no hairs beneath on femora. Lucas in

original description says antennae yellow-brown, except black first and second flagellar joints, so at least six or seven would be pale; in 1919 (p. 84) last four yellowish; mine agree with original description.

Pepsis (Cirripepsis) moesta spec. nov.

Body black, abdomen somewhat violaceous; antennae black on first, second, and base of third joints, beyond rufous; legs black, femora somewhat purplish. Wings black, but not deep black, slightly paler beyond cells, in some views the veins are bluish. A few hairs on lower clypeus, and on front near eyes, short hair on pronotum, much longer on pleura and propodeum, long fine hairs on femora, some about as long as width of joint; short, fine, dense hair on last segment of abdomen above, also below; some hairs on second ventral segment beyond groove, few elsewhere.

Clypeus almost angularly emarginate below; lateral ocelli about twice as far from eyes as from each other; vertex-width much longer than third antennal joint; propodeum with a very low mid-ridge, about twelve ridges before it, posterior slope with some finer ridges; stigmal tubercle fairly large, lateral very small, mesosternal at base of coxal slope and fairly prominent; abdomen smooth and shining above.

Femora slender, shining, hind tibia with about twelve small teeth above, well separated, the stout spines are longer, inner spur not one-third of basitarsus, but fully one-fourth.

In fore wings the end of second discoidal cell is no longer than base of the second submarginal cell, third submarginal rather long, only a little broader than the second, the second recurrent ends plainly before middle, upper side about as long as basal, somewhat like Lucas' figure 194, but the recurrent further out.

Length of fore wing 18 mm.

From Ninabamba, near Ayacucho, Peru, 1900 m., December (Weyrauch). Type M. C. Z. no. 26198.

Pepsis (Cirripepsis) ilione spec. nov.

Black, with a strong purple sheen, also on legs; wings black, no especial iridescence; antennae black, last six joints rufous (or sometimes part of a seventh). Head not especially flat, antennal base protuberant; clypeus more than twice as broad as long, below only slightly concave, some bristles on lower half; lateral ocelli fully one and one-half times as far from eyes as from each other; vertex but

slightly arcuate, third antennal joint plainly shorter than vertex-width, a few hairs each side by eyes. No noticeable hair on pronotum above or in front; propodeum but slightly wider by stigmal tubercles, latter very low and broad, a mid-ridge, but low as other ridges, about ten ridges in front of it, somewhat irregular, and several finer ridges on the posterior slope; lateral tubercles very small but pointed; meso-sternal tubercle low; meso- and metapleura, coxae, and all femora with very long, fine hairs, many longer than width of joint; venter with a few hairs on each segment, more on fifth, and the last covered very fine, dense hair, above the last segment with dense, fine erect and some recurved hair.

Legs rather short, the hind tibia with a row of low teeth, hardly one-half as high as the spines, and the hairs a little longer, inner spur hardly one-third of basitarsus, claws have the tooth at middle.

Fore wings with first recurrent vein shorter than the base of the second submarginal cell, second submarginal cross-vein curving obliquely backward; third submarginal cross-vein sloping outward and behind middle turns curving toward medius, the cell about one and one-half times as long as broad, receiving the second recurrent plainly before middle, the apical stub very short. Maxillary palpi with second joint about equal to third.

Length of fore wing 16 to 17 mm.

Females from Valle Chanchamayo, Peru, 800 m., 1-8-39, (Weyrauch); Hacienda no. 2, Col. Perene, Peru, 15 June (Williamson); La Chorrera, Putumayo Distr., Peru, 17 to 20 August (Cornell Exped.); Iquitos San Rogue, Peru, June (Klug); Iquitos, Peru (Bassler) Amer. Mus. Nat. Hist.

Type M. C. Z. no. 26199; paratypes there, at Cornell University, and Amer. Mus. Nat. Hist.

Pepsis (Cirripepsis) orestes spec. nov.

Black, with purple sheen, legs also purple; antennae black, last six joints rufous; wings an even black, no iridescence. Clypeus angularly emarginate in middle below, surface with bristles on lower part; maxillary palpi with the second joint much shorter than the third; front with a few long hairs each side; lateral ocelli over one and one-half times as far from eyes as from each other; third antennal joint shorter than vertex-width.

Pronotum with a few very short hairs above; pleura, coxae, and femora with very long, fine hairs; sternum with much shorter hairs;

mesosternal tubercle rather prominent. Propodeum with a low mid-ridge, hardly higher than other ridges, in front about ten ridges, posterior slope with two or three coarse and several finer ridges, a median impressed line, and surface with scattered long hairs; the stigmal tubercles low and broad, the laterals small.

Abdomen at tip with a large, dense tuft of fine erect hair, last segment below with a similar tuft, other ventral segments with some long hairs, mostly in rows. Legs rather short; hind tibia with a row of small teeth, not near as high as the spines and longer bristles, inner spur nearly one-third of the basitarsus; claws with tooth near middle.

Fore wings with the first recurrent shorter than the base of the second submarginal cell; third submarginal cell about one and one-fourth times as long as high, outer side at first sloping, then behind middle curving down to medius, the stub at tip of cell very short, the second recurrent vein (nearly straight) ends plainly before middle.

Length of fore wing 24 mm.

Females from Puerto Bermudez, Rio Pichis, Peru, 9 to 13 July (Cornell Exped.); La Chorrera to La Sombra, Putumayo Distr., Peru, 31 August (Cornell Exp.); and Hda. San Juan, Col. Perene, Peru, 28 June (Cornell Exp.).

Type in Cornell Univ., paratype there and at the M. C. Z. no. 27126. It has about as much hair on second ventral as *vicina*, but the hind tibiae have distinct teeth.

Pepsis (Cirripepsis) purpureus Smith

Described from Tapajos, Brazil; a female from Chenapown, British Guiana.

This is readily separated by the definite impressed line on middle of propodeum from base to tip; no mid-ridge; on the posterior slope the striae are about as coarse as usual, on basal part the striae are extremely fine, but extend to the edge above spiracles; the basal and lateral humps both very weak.

The body and femora have a purple to bluish hue, and on abdomen, which is smooth and polished, a steel-blue in certain views; wings pale brown, veins brown to yellowish in basal part; the antennae in this specimen has six segments above and eight below yellowish.

The clypeus is only a little concave in middle of lower margin, not angulate; second plus third antennal joint equal to vertex-width; the base of abdomen is constricted into a true petiole, concave on

sides; venter has only a few hairs near middle of each segment, except near tip, these segments smooth and shining; mid and hind coxae with only a few short hairs, none on femora except small ones near tip above; mesosternal tubercle distinct and fairly sharp.

In fore wings the second submarginal cell long, both ends much oblique, the hind end with lower part bending back more than usual; the third submarginal cell longer above than broad, second recurrent vein ends barely before middle; in hind wings the anal vein ends much nearer to fork than to outer margin.

The hind tibiae have very small sloping teeth on basal part, and longer, stiff, curved bristles.

Pepsis (Cirripepsis) sagana Lucas

Females from Kartabo, British Guiana; Restrepo, Dept. Meta, Colombia, 500 m., August (Bequaert); Vista Nieve, San Lorenzo Mt., Colombia, 14 December (Bequaert). There are no hairs beneath on femora.

Pepsis (Cirripepsis) laconia spec. nov.

Body black, with blue or purple over many parts; legs and antennae black, latter with five to eight joints more or less yellowish; wings dark brown, veins black, fore wings with a faint bluish iridescence. With but few hairs, only short ones on vertex, none on propodeum, none on antennae, few, rather short, on coxae, none on rest of legs.

Clypeus slightly and acutely indented in middle of lower margin, face hardly broader than high, from in front vertex is plainly convex, frontal groove very deep; ocelli in a small triangle, hind ones almost twice as near each other as to eyes; antennae moderately short, second plus third joints equal vertex width; pronotum with rather low shoulder ridges, margin angulate behind; propodeum (from side) low, evenly and slightly curved, plainly and fairly evenly ridged, mid-ridge hardly distinct, posterior slope somewhat ridged, lateral tubercles small, stigmal ones scarcely larger. Abdomen about as usual, numerous fine hairs on last segment above and below, few on other ventral segments. Legs moderately long and slender, hind tibia with small teeth fairly close (other specimen with teeth not evenly developed), inner spur more than one-third of basitarsus.

Venation much as in allies, the submarginals and second recurrent much as *aurimacula*.

Length of fore wings 18 mm.

Two females from Achinamiza, Peru, 20 April, 4 May (H. Bassler), and one from Moyobamba Region, Peru, 22 December, type in Amer. Mus. Nat. Hist., paratype M. C. Z. no. 26197.

Subgenus Stenopepsis Banks

I have placed here species in which there is no groove back of ocelli, the latter being practically as high as vertex. Most of the species have rather slender bodies; all are rather small; there are bristles near tip of abdomen pointing toward tip of abdomen. The few males known (including *hymenaea*) have no ventral groove. There are several groups of species in this subgenus as it is here used. *P. hymenaea* (the genotype) and *P. cofanes* are extremely hairy as in Trichopepsis; they are very slender species with long legs and a peculiar type of subgenital plate; both sexes are known. In the group of *elongata, longula, gracilis, australis* only females known, all with rather slender abdomen, slightly depressed and often polished.

The *pretiosa* group, males of six species are known, females of two or three, all are closely related to each other; they might well form another section.

The *festiva* group of which females of two or three species are known, these females have the vertex as in the typical forms of the genus; *parthenope, purpureipes,* and probably *ierensis* go here, possibly *flavilis* and *cybele*. *P. sulcifrons* and *P. alector* have a similar type of marking; both known only from females.

P. strenua stands by itself, possibly belonging elsewhere; only the female known.

P. venosa and *P. mystica* may belong to Cirripepsis.

Synopsis of species

Females

1. Wings wholly black or brownish 2
   Wings with some yellowish, reddish, or tip white 8
2. Hind margin of several abdominal segments slightly sinuous; abdomen flattened, polished; antennae black ..... *elongata*
   Margin of segments not sinuous, abdomen not especially flattened 3
3. Antennae black 6
   Several joints of antennae rufous or pale; base of marginal cell oblique 4

4. Abdomen bright blue or bright green 5
Abdomen black or faintly bluish or greenish 7

5. Body brilliant blue; legs purple ..... *purpureipes*
Body brilliant green, also much of legs ..... *parthenope*

6. Base of marginal cell almost truncate (at right angles to costa); wings blackish, tips of fore pair faintly pale ..... *ierensis*
Base of marginal cell oblique; wings greenish iridescent; tips of wings not pale ..... *aenipennis*

7. Abdomen black, faintly if at all bluish; wings black; seven or eight joints of antennae pale ..... *hymenaea*
Abdomen black, faintly greenish, wings pale brown; only four joints of antennae pale ..... *mystica*

8. Fore wings black, with a snow-white or yellowish tip 19
Not so but rufous, ferruginous, or yellowish over much of wing 9

9. Wings black, with yellowish part on basal half 10
Wings mostly rufous or yellowish 11

10. Basal one-third of hind wings yellowish, beyond black ..... *flavilis*
Basal fourth of hind wings brown, then pale yellowish to the black apical fourth ..... *cybele*

11. Some golden hair on thorax and propodeum; antennae rufous ... *optimatis*
No golden hair on body 12

12. Base of marginal cell truncate; wings ferruginous, darker on outer margin; apical half of antennae brownish yellow ..... *gracilis*
Base of marginal cell more or less oblique 13

13. Abdomen flattened, polished, and margins of several segments slightly sinuous; wings largely ferruginous; antennae black .. 14
Abdomen not flattened, scarcely polished, and hind borders of segments not at all sinuous 15

14. Outer half of apical field of fore wing whitish hyaline; anal field of hind wings yellowish ..... *australis*
Apical field ferruginous as rest of wing ..... *longula*

15. Wings rufous or yellowish, darker on outer and also on hind borders 16
Wings not darkened, at least along hind borders 17

16. Fore wings black along costa as well as at tip and hind border, hind wings largely dark, body green to deep blue ..... *sulcifrons*
Fore and hind wings pale rufous, bordered behind and at tip with dark ..... *alector*

17. Wings pale yellowish; first three antennal joints black rest yellowish ..... *cofanes*
Wings rather evenly rufous to ferrugineous; six joints of antennae black 18

18. Apical half of antennae yellowish; wings rather slender ..... *incerta*
Antennae wholly black; wings fairly broad, pale yellowish ..... *venosa*

19. Nearly apical half of the broad fore wings yellowish ..... *strenua*
Tip of wing hyaline-white, not nearly one-half of wings, (some species known only from males) 20

20. Third submarginal cell longer above than broad 21
Third submarginal cell broader at base than long above and partly black 22

21. The apical white includes nearly all of the third submarginal cell, basal tubercles very large; abdomen not polished ..... *egregria*
The apical white over only outer half of apical field; third submarginal cell wholly black; abdomen slender, polished; anal field of hind wings yellowish ..... *australis*

22. Third submarginal cell partly pale; head and thorax with much long hair ..... *pretiosa*
Third submarginal cell wholly dark 23

23. Tip of hind as well as fore wings white ..... *albolimbata*
Tip of hind wings dark 24

24. White tip about as long as marginal cell ..... *insignis*
White tip much shorter 25

25. Median carina of subgenital plate reaches almost to tip of plate ..... *cyanosoma*
Median carina of subgenital plate about one-half the length of plate ..... *venusta*

Pepsis (Stenopepsis) hymenaea Mocs.

Male from Vista Nieve, San Lorenzo Mt., Colombia, 16 December (Bequaert).

The terminal ridge of propodeum strongly produced into a sharp point at each outer corner. The hind tibiae and tarsi are not compressed, and without hair-crests, but only short hairs and bristles above and the usual spines below; the inner spur is about two-fifths of the basitarsus; the basal segment of abdomen has short hair on upper side; there is little hair on venter, almost none on fourth segment, the modified sub-genital plate is short, and seen from side bent near middle, and the apical part with dense, erect hair.

Pepsis (Stenopepsis) cofanes spec. nov.

Female. Body black, abdomen shining above, wings yellowish, tip almost hyaline, in hind wings infuscate at base and along hind margin; antennae yellowish, black on first, second and part of third joints. Head and clypeus with long but not dense hair, also on

pronotum and short hair on mesonotum, pleura and propodeum with long hair; also on coxae, and a few on femora below, none on abdomen at base, but tip with the usual sloping bristles.

Body very slender, antennae and legs elongate. Clypeus below very faintly and evenly concave, face but little narrowed above, from in front the vertex is curved, and ocelli at the top above eyes; lateral ocelli more than twice as near each other as to eyes, no pits nor transverse depression near ocelli; antennae with third joint longer than width of vertex; pronotum almost arcuate behind; propodeum slender, low and sloping evenly to tip, no mid-ridge, with a few cross striae above, sides with some long hair; abdomen fusiform, widest at middle of second segment, basal segment petiolate, longer than broad behind. Legs long and slender, hind tibiae with small teeth in row, a short spine near each tooth, and longer and finer bristles in row; front tibiae much longer than width of head, with slender spines on apical part on outer side.

In fore wings marginal cell about one-half its length from wing-tip, second submarginal cell nearly three times as long below as broad; third submarginal cell more than two-thirds of second below, narrowed one-third above, outer side curved and sloping, second recurrent vein (slightly curved) ends beyond basal third; in hind wings the anal vein ends nearer to forking of cubitus than to hind margin.

Male with rather darker fore wings, but tip narrowly pale; hind wings almost wholly blackish, but chiefly at base, tip, and along hind margin, elsewhere rather dark, the veins bordered with yellow; antennae black out over fourth joint; anal lobe wholly black; propodeum slender, with some cross-ridges above, clothed with very long hair; basal segment of abdomen elongate, a minute tubercle each side near base; hind legs longer than body, very slender, hind tibiae with a crest of hair but not high enough to hide the bristles, tarsi without a distinct crest, the spines and bristles prominent all around joints. Wings much as in female, no hair modifications on venter, the subgenital plate small, covered with erect hair, the tip angulatedly emarginate, very similar to that of *P. hymenaea*.

Length of fore wings ♀ 20.5 mm. ♂ 20 mm.

A pair from Banos, Tungurahua, Ecuador, 1600 to 1900 m. (W. C. MacIntyre) Type M. C. Z. no. 26680. Also a male with darker fore wings from Mera, Ecuador (F. X. Williams).

Pepsis (Stenopepsis) gracilis Lepel.

A female from Bartica, British Guiana, 4 March (Cornell) also St. Laurent, Guyane.

Body black, wings dull ferruginous, becoming paler near tip, a tinge of black at base, soon fading out; legs black, antennae rufous, first three joints black, but the third is partly pale near tip. Body slender, but not as much so as *hymenaea*, head small as in that species tibia of front legs longer than width of head; clypeus fully twice as broad as long, slightly concave below, long hairs on lower part; face much narrowed above, from in front vertex evenly convex; ocelli not quite to top, no groove back of ocelli, hind ocelli plainly nearer each other than to eyes, front with scattered hairs in middle, longer ones near eyes; antennae moderately short, tapering near tip, third joint itself longer than vertex width; pronotum vertical in front, slightly angulate behind, with little hair, shoulders not prominent; mesonotum with one erect, long hair each side; pleura hairy; propodeum with mid-ridge rather low, but posterior slope well separated from basal part, latter rounded transversely, with rather even ridges, posterior part moderately steep, with some ridges, both parts hairy and quite densely near mid-ridge, stigmal tubercles not prominent, rounded, lateral tubercles more noticeable, but also rounded. Abdomen fusiform, depressed, but not as much as in *elongata*, not polished, tip very hairy and bristly both above and below, few other hairs on venter; legs not especially long, but femora very slender, hind tibia with usual row of teeth and longer spines above, the inner spur nearly one-third of basitarsus.

In fore wings the marginal cell more than one-half its length from wing-tip, base of cell truncate, not sloping as usual, nearly as broad as second submarginal cell, latter over twice as long below as broad, third but little shorter below and above nearly as long as second, much wider, outer side curved, receiving the second recurrent (sloping and slightly curved) at a little before middle; in hind wings the anal vein ends about as near margin as to forking of cubitus.

A slightly larger female with frayed darker brown wings agrees in venation, the marginal cell truncate at base, etc. It is from St. Laurent, Guyane.

Pepsis (Stenopepsis) elongata Lepel.

A female from Kaieteur, British Guiana, 31 July.

Fore wings black, somewhat shining; abdomen deep black, polished, legs black, antennae with about eight joints yellowish.

Clypeus concave in middle of lower margin; vertex, from in front, straight across, with some long hairs, second plus third antennal

joints about equal vertex-width, hind ocelli not twice as near each other as to eyes, head slightly hairy; pronotum fully as long above as in *gracilis*, behind angulate, shoulders not nearly as prominent as in *gracilis*; propodeum with a median furrow in front, in front with fine striae, behind coarser, lateral tubercles low, no mid-ridge Fore wings with the basal vein ending not as far in front of transverse as in *gracilis*; the third submarginal cell has upper side longer than in the Lucas figure 266. On hind tibiae there is a row of small sharp-pointed well-separated teeth, the bristles much longer.

Pepsis (Stenopepsis) longula spec. nov.

The fore wing is dark rufous, brown beyond cells, extreme base black, the abdomen slender, flattened, and polished above; the segments beyond the second are slightly concave on hind border; legs very slender, front tibia hardly width of head; antennae short, second plus third segments equal vertex width, in ocelli nearer each other than to eyes, no groove behind ocelli, nor ridge across vertex; clypeus quite deeply concave in middle of lower margin; stigmal and lateral tubercles low and rounded, no mid-ridge, mesosternal tubercle prominent laterally; last joint of hind tarsus a little curved, tooth a little beyond middle, but one stout bristle before it; hind tibia with a row of small but distinct teeth, with adjoining stout spine and much longer bristles; front of pronotum vertical; head (from side) very thin, almost no lateral space behind lower part of eye. Little hair anywhere; some at tip of abdomen above and below, a little on clypeus below, and a few on front and vertex, mesonotum with two long erect hairs each side. Venation much as in *elongata*, but the third submarginal cell is not so much broader than the second, but fully as long, second recurrent vein (oblique, not curved) ends before middle, basal vein (as in *elongata*) ends nearer transverse than in *gracilis*, base of marginal cell as oblique as in *elongata*; in hind wings anal vein ends much nearer to the cubital fork than to hind margin.

Length of fore wings 23 mm.

One female from "Cayenne", another from St. Laurent, Guyane.

Type M. C. Z., no. 26078, paratype at Cornell University.

Pepsis (Stenopepsis) venosa Banks

Described from Surinam, and Moengo, Boven Cottica River, Surinam (Cornell Univ.).

Pepsis (Stenopepsis) flavilis Brèthes

A female from Santa Cruz, Bolivia (Steinbach), agrees with his figure and short description.

Head, from side, not especially thin below, more like *mystica*, face broad, scarcely narrowed above, hind ocelli almost twice as far from eyes as from each other; antennae short, second plus third joints not equal to the very broad vertex. Pronotum vertical in front, shoulders little elevated. Propodeum without distinct mid-ridge, evenly and closely ridged, posterior slope rather steep, the tubercles are not distinct, and the mesosternal angle does not project laterally. Legs slender, last joint of hind tarsus lightly curved, tooth small and near middle, one bristle and one hair before it; teeth on hind tibia well separated and small, inner spur almost one-third of basitarsus, venation much like others, the third cell much as in *venosa*.

Pepsis (Stenopepsis) australis Saussure

One female from "Cordisburgo", 8 November.

Pepsis (Stenopepsis) purpureipes Packard

Body bright deep blue; legs purple; wings brown, veins darker; antennae black, above apical five joints yellowish, below six joints, front of head of type now greenish.

Clypeus slightly arcuate below, long bristles on lower part; frontal groove complete and very distinct; vertex broad, second plus third antennal joints about equal vertex-width; hind ocelli plainly more than twice as far from eyes as from each other; short hair on front and vertex; mesonotum as in *parthenope* the side-ridge weak; propodeum with a distinct mid-ridge, in front are ten to twelve ridges, fairly even, from side view the basal part is convex; posterior slope with finer transverse ridges, a faint indication of an oblong middle area behind mid-ridge, but crossed by striae; basal tubercles distinct, laterals weak; surface with scattered long hairs. Sixth segment of abdomen densely clothed with sloping black hairs, a few above on fifth segment; last ventral with fine hairs and a few on fifth ventral. Hind tibia with fourteen to sixteen teeth, triangular and fairly sharp only first basal weak, inner spur nearly one-third of basitarsus; a few long hairs on front femora. In both fore wings no vein beyond lower end of third submarginal cell. Type M. C. Z. no. 506.

Pepsis (Stenopepsis) consimilis spec. nov.

♀ Very similar to *purpureipes*, a size smaller. The body brilliantly blue to greenish; legs purple; antennae black, with four or five apical joints pale; the wings of the same dark brown as *purpureipes*, but tip is not paler; there are no essential differences, except that the basal vein is hardly as far before the transverse; third submarginal a little shorter, but varying in some specimens.

The propodeum shows definite differences; the ridges on basal part are broken or weak each side in the depressed part and quite irregular (in *purpureipes* nearly all reach all across and not weaker on sides); the mid-ridge is not especially high, but quite broad; the posterior slope is quite steep, just below the mid-ridge is an elongate depressed area, bounded laterally, not so much below, few if any ridges in this area, but each side the ridges reach to side-margin but mostly in front, the lower part free of ridges, or very fine one; *purpureipes* has no such definite median depressed area. The lateral tubercles are small but fairly prominent. The terminal ridge is very low and each lateral corner is elevated only a little, hardly one-half as high as in *purpureipes*. The mesosternal tubercle is not as prominent as in that species, nor as pointed at tip.

Length of fore wings, 16 to 18 mm.

Females from Tena, Ecuador, 4, 27 March, 20 April (Williams); El Eucanto, Putumayo District, Peru (Cornell Exped.).

Type M. C. Z. no. 27203, paratype there, at Cornell, and with Mr. Williams; a larger specimen with darker, more shining wings agrees generally, it is from Sucria, Rio Upano, Ecuador, 3 February (Brown) Amer. Mus. N. H.

Pepsis (Stenopepsis) incerta spec. nov.

Black; bluish on head and abdomen, less on thorax, legs black, femora somewhat bluish; antennae black, with six joints on apical part yellowish; wings dull rufous, or brownish ferruginous, evenly colored, not darker, nor paler, at tip, base of fore wings black for a very short distance along two veins.

Body rather slender, hardly as much as in *cofanes*, abdomen plainly convex, not polished, base about as in *cybele*, not as much a petiole as in *cofanes*. Clypeus about straight across lower margin, barely a trifle concave in middle; head moderately hairy; hind ocelli nearly twice as near each other as to eyes; from in front vertex is scarcely convex; second plus third antennal joint longer than vertex-width;

pronotum short, arcuate behind, shoulders not prominent, few short hairs above; mesonotum from side arched.

Propodeum with a faint median furrow; in front the striae are fine, behind larger and even, no mid-ridge, lateral tubercles, small; but pointed; mesosternum projects a little laterally, ending in a small knob, scaracely noticeable from above; abdomen rather short, last segment very bristly, venter with few hairs except on last segment; legs slender, all coxae with a few long hairs, hind tibiae with a row of moderate teeth, sloping, the spines scarcely higher, but longer. In fore wings the venation much as in *cofanes*, basal vein ends far before transverse, marginal cell as long, but base not as oblique; third submarginal not as much shorter than second, and wider than in *cofanes*; second recurrent (slightly sinuous) ends at end of basal two-fifths of cell; in hind wings, anal vein ends about one-half way to margin.

Length of fore wings 20 mm.

One female from Achinamiza, Peru, Sept. (Bassler) in Amer. Mus. Nat. Hist.

Pepsis (Stenopepsis) mystica Lucas

An old, rather poor, specimen from "Brazil".

Four joints of antennae rufous, and fore wings rather pale blackish, hind wings nearer hyaline, abdomen greenish. Structure agrees well with description. It may belong to Cirripepsis; the wings may not be fully colored.

Pepsis (Stenopepsis) alector spec. nov.

Female. Body black, more or less bluish in places; antennae black but last four joints above and five below are rufous; legs black, femora and tibiae with a bluish sheen; wings dull brownish yellow, tip and hind margin of both pairs nearly evenly bordered with brown. Clypeus hairy below, some short hairs in middle of front, a few longer ones near eyes, pronotum with some scattered short hairs on sides, not in front, lower pleura and sides of propodeum hairy, few hairs on propodeum above, tip of abdomen above and below densely hairy and bristly some quite long, a few rather long hairs on ventral segments; femora with a few short hairs above; ridges over base of hind wings yellowish. Clypeus scarcely concave below; face somewhat narrowed above, from in front the vertex nearly straight across at

top of eyes, the ocelli at top; ocelli rather large and close together, laterals nearly twice as far from eyes as from each other; antennae moderately long, second plus third joints fully equal vertex-width, pronotum somewhat rounded in front, not vertical, broadly arcuate behind, shoulders not prominent. Propodeum from side almost evenly curved, posterior part separated by a change in slope, no distinct mid-ridge, but two of usual ridges are close together; about twelve ridges before turn, at least ten on posterior slope, mostly broken in middle; tubercles low, laterals a little larger; mesosternal tubercle distinct but not projecting laterally, terminal ridge with low rounded corners. Abdomen moderately slender, nearly fusiform, widest beyond middle of second segment, basal segment moderately elevated at base, hardly as much as in *gracilis*; legs fairly long, tibia of front pair fully equal width of head; hind tibiae above with a row of very small, low and widely separated teeth, the spines longer, inner spur hardly one-third of basitarsus.

In fore wings the marginal cell is long, fully one-half its length from wing-tip, hardly as broad as second submarginal cell, base plainly oblique; second submarginal two and one-half times as long below as broad, base very oblique, tip less so and curved; third submarginal cell about two-thirds as long as second, broader, narrowed one-half above, outer side sloping and then curved below, receiving the second recurrent vein at basal third; in hind wings the anal vein ends a little nearer to forking of cubitus than to margin, metanotum smooth; terminal ridge with low, rounded corners; mid and hind tibiae with short hairs above; anal lobe black.

Length of fore wings 28 mm., width 8 mm.

One female from Rio Itaya, Amazonas, Peru, December, (W. Klug coll.) (Cornell Univ.).

Pepsis (Stenopepsis) sulcifrons Cameron

A female marked "Equateur" (Cornell Univ. coll.)

Body blue to green, but mostly blue. Clypeus slightly evenly concave on lower margin, hair on lower part only; face a little narrowed above, from in front the vertex is evenly though slightly convex, ocelli at top, lateral ocelli in a line with top of eyes, and much closer to each other than to eyes; front with scattered fairly long hairs in middle, also a row near eyes, median groove distinct no transverse groove back of ocelli; antennae short, second plus third joints about equal vertex-width; pronotum vertical in front, few scattered

erect hairs, arcuate behind, shoulders of moderate size; mesonotum with three long erect hairs each side before wingbase; propodeum (from side) evenly curved above, a low mid-ridge separates the two areas, basal part with about fifteen irregular ridges, posterior slope moderately steep, three or four short ridges in middle, stigmal tubercle not prominent, above with rather long, but scattered, sparse hair; lateral tubercles small, mesosternal ones prominent. Abdomen moderately convex above near base (about like *ferrugineus*) tip of abdomen very hairy above and below. Front tibia about equal to width of head, basitarsus with slender sharp-pointed spines in the comb, mid-ridge of hind tibia with row of teeth, rather small and longer spines, inner spur about equal one-third of basitarsus, last joint of hind tarsus nearly straight, claw with large tooth before middle, one stout bristle, before tooth and one hair.

Wings slender, marginal cell hardly one-half its length from wing tip, not quite as wide as second submarginal cell, latter more than twice as long below as broad, base very oblique; third submarginal cell more than two-thirds as long as second, but much wider, narrowed above nearly one-half, outer side evenly curved below, above sloping, receiving the second recurrent vein at basal third; in hind wings the anal ends nearer to the forking.

The fore wings are dull rufous in middle, dark brown all around; hind wings wholly blackish. Metanotum with two carinae each side; ridges over base of hind wings are yellowish; terminal ridge low, with rounded corners.

Pepsis (Stenopepsis) ierensis Banks

Described from Trinidad, also from Bucay, Ecuador, 4 October; and Colombia (F. Orallo) Amer. Mus. Nat. Hist.

Pepsis (Stenopepsis) aeneipennis spec. nov.

Body black, not as prominently blue as most species, abdomen slightly shining, antennae with eight segments brownish, the last two more yellowish, wings pale brownish yellow, brassy to coppery iridescent, both pairs black near base, in front wings one-third way out to basal vein. Head moderately hairy, very few and short hairs on pronotum, a few longer each side on mesonotum, propodeum with some short hair above, posterior slope with long hair on sides, none on basal segment of abdomen, tip of abdomen with usual tuft, venter

with a few long erect hairs near middle of each segment, femora with a few short hairs near tip above.

Clypeus only lightly concave below, depression each side from ocelli to eyes, frontal groove in deep depression, vertex from in front slightly convex; hind ocelli much nearer each other than to eyes; antennae short, not nearly reaching to propodeum, second plus third fully equal vertex width; pronotum arcuate behind, shoulders not very high, in front sloping; propodeum divided rather sharply by a low mid-ridge, basal part with a broad median furrow, and with fairly even, well-separated ridges, lateral tubercles prominent; posterior slope rather steep, scarcely striate, much as in *hirtiventris;* hind tibiae with row of small, moderately sharp teeth, longer stout spines and fine bristles, inner spur not one-third of basitarsus.

In wings venation much as usual, third submarginal cell not as long as second, but broader, bent down near middle, outer side rounded, but little narrowed, receiving the second recurrent before middle. In hind wings the anal ends about one-half way to margin.

Length of fore wings 25 mm.

One female from the Rio Huallaga, Peru, 25 to 28. July (Bassler) Amer. Mus. Nat. Hist. A darker female probably from Bogota, Colombia (F. Ovalle) is evidently the same species, the wings much darker, but with the same brassy iridescence, the same venation and body structure. Paratype M. C. Z. no. 27125. The male is similar with paler, more hyaline, but still greenish wings; the abdomen is slender and there are a few (seven or eight) long, erect, curved hairs each side on fourth ventral, they are not close together but quite widely separated, and there are many shorter hairs among and between the two groups; the subgenital plate is broader than the usual *Pepsis* (*ruficornis*) but not as broad as in *egregria* and *pretiosa.*

The hind legs are very long, tibiae and tarsi compressed and with dense hair-crests, and above, obscuring the spines; inner spur almost one-half of basitarsus.

Pepsis (Stenopepsis) optimatis Smith (Fig. 1)

A female from Chapada, Brazil agrees with the description. Abdomen blue, with a green sheen, wings a trifle darker than in *P. plutus,* but no pale tip; the third submarginal cell as long above as at base, the outer side nearly angulate just below middle. The fourth ventral segment with a short row of dark brown hairs curved inward and backward, not erect. The subgenital plate is long, with parallel sides,

tip rounded, surface near tip with short dense, minute hair, the basal part shows a more or less distinct median ridge according to view.

The abdomen is attached by a true petiole, the first segment has a tiny knob on each side. The hind tibiae and tarsi are strongly compressed and with dense hair crests.

Pepsis (Stenopepsis) strenua Erichs.

Females from Forest Settlement, Mazaruni River, August, September (N. A. Weber); Georgetown, 15 February, Kartabo, Bartica District, and Tukeit, 18 July (A. M. N. H.), all in British Guiana.

The last joint of hind tarsus is curved almost as much as in Gigantipepsis, the tooth on claw near middle, the vertex, however, is not as high as in Gigantipepsis; the metanotum shows no carinae.

Pepsis (Stenopepsis) erdmanni Luc.

Males from Restrepo, Dept. Meta. Colombia 500 m. August (J. Bequaert); Muzo, Dept. Boyaca, Colombia, 900 m., 20 to 30 June (J. Bequaert); Sint Barbara Plan., Surinam 15 April (Cornell).

The hind tibiae and tarsi are not compressed, and with only a trace of a crest on tarsi, much as in *P. parthenope*.

Pepsis (Stenopepsis) festiva Fabr.

Male from Northwest part of Trinidad (Ballou, Urich, and Fennah); Buenavista, near Santa Cruz, Bolivia (Cornell); Bucay, Ecuador, 1000 ft., 4 October (F. X. Williams).

The hind tibiae and tarsi are compressed, a fairly dense, but low crest; the basitarsus curved, with low crest above, and a little on second and third joints.

Pepsis (Stenopepsis) flavescens Luc.

Male Tacuru-Pucu, Paraguay, 2 to 7 April (Donald Wees).

The hind tibiae and tarsi are as in *P. amyntas*.

Pepsis (Stenopepsis) thalia Mocs.

Male from Iquitos San Roque, Peru, January (Cornell).

Pepsis (Stenopepsis) hyalinipennis Mocs.

Males from Maracaju, Matto Grosso, Brazil (Fairchild) and Nova Teutonia, Santa Catharina, Brazil, March (Plaumann).

Tibiae and tarsi as in *amyntas*.

Pepsis (Stenopepsis) parthenope Mocs.

Male and female from San Antonio, Colombia (Cornell), and Rio Vitaco, Colombia (Cornell); Quindiu Pass, Colombia; Tocoto, Colombia; Villa Elvira, Cauca, Colombia.

The male has the hind tibiae and tarsi not compressed, tibia not crested, the basitarsus curved, and a slight crest of hairs between the spines; inner spur about two fifths of basitarsus.

Pepsis (Stenopepsis) amyntas Mocs.

Male and female from Villa Rica, Paraguay, February (Schade, Cornell); Jujuy, Argentina, February, (Cornell Exped.); El Encanto, Putumayo Dist., Peru, 25 August (Cornell Exped.); Buenavista, near Santa Cruz, Bolivia (Steinbach, Cornell). La Chorrera to la Sombra, Putumayo Dist., Peru (Cornell).

The hind tibiae and tarsi are compressed, with low crests above, below the spines show; inner spur of hind tibiae about two-fifths of basitarsus.

Pepsis (Stenopepsis) citricornis Lucas

Male from Rio Negro, East Colombia (Cornell).

Pepsis (Stenopepsis) cyanosoma Mocs.

Male from northwest part of Trinidad (Ballou, Urich, Fennah). Also from Guatemala.

Pepsis (Stenopepsis) venusta Sm.

Male from Corumba, Brazil (Thayer Exped.) another, very small, from Urucum, Corumbá, Brazil, Harris coll. (Cornell Univ.)

Pepsis (Stenopepsis) albolimbata Sm.

Males from Ecuador (E. W. Rorer); Bucay, Ecuador, 1,000 ft., 4 October (F. X. Williams); Naranjapata Ecuador, 1850 ft., December (F. X. Williams).

Pepsis (Stenopepsis) pretiosa Dahlb. (Fig. 13)

A female from Corupa (Hansa Humboldt) St. Catharina, Brazil, February (A. Maller coll. A. M. N. H.).

Pepsis (Stenopepsis) insignis Mocs.

Male from Iquitos, San Rogué, Peru, December (Klug coll. Cornell); Medina and Rio Negro, Colombia (Cornell); Middle Rio Ucayali, Peru, 27 February (Bassler, A. M. N. H.).

Pepsis (Stenopepsis) egregria Mocs. (Fig. 14)

Male and female from Santa Cruz, Bolivia, and Buenavista, near Santa Cruz, Bolivia, all by Steinbach; Tumatumari, British Guiana, July (F. X. Williams); Caracas, Venezuela (A. M. N. H.), Cauca Valley, Colombia (A. M. N. H.).

In the male the lateral corners of the propodeum are very prominent and more pointed than in allied species.

Subgenus Pepsis

The remaining species I leave in Pepsis temporarily; some of the males belong to some of the preceding subgenera. The species belonging to the *decorata* section may later be placed in Deropepsis, one or two may go to Trichopepsis, and some to Stenopepsis or some new subgenera. I have divided these species according to the presence or absence of a real groove on the second ventral segment of the male. It will be noticed that in a few species there is partial groove or line, usually very faint, on sides of second segment; I do not consider this a real groove, by which I mean a groove completely across the segment.

The length and density of hairs is very useful in separating species but is rarely referred to in descriptions. A few species are known, as *optimatis, chloe,* which have the first segment of abdomen narrowed almost to a real petiole as in Pseudagenia; these may form a group. Below is a table to the males which I have seen and not placed elsewhere.

1. Second ventral segment with a distinct groove reaching across 2
   Second ventral segment with only a depression or a faint indication of a groove or a short median line 15
2. Venter without hair modifications, but the subgenital is modified 3
   Venter with hair tufts; subgenital plate normal 7
3. Hind wings black, except sometimes a hyaline tip; silvery or yellowish marks on the black fore wing 4
   Hind wings with yellowish or rufous in middle 6

4. A curved whitish mark over base of second discoidal cell, as well as one at base and along costa ..... *vau-alba*
   No such mark over base of second discoidal cell; spot or band near base and along costa pale 5

5. Tips of wings black ..... *decorata*
   Tips of both wings hyaline-whitish ..... *equestris*

6. Tips of wings broadly brown, costa of fore wings yellowish; subgenital plate with a cross-ridge parallel to apical ridge ..... *foxi*
   Tips of both wings hyaline-white ..... *prixi*

7. Fore wings mostly yellowish to rufous 8
   Fore wings mostly black 9

8. Fore wings beyond closed cells brown, fourth ventral with erect hair all over middle, the hairs on sides longer ..... *fuscobasalis*
   Fore wings with the very dark tip extending over much of marginal and third discoidal cells; fourth ventral with a tuft each side, the tips incurving, space between smooth ..... *spegazzinii*

9. Tips of hind wings hyaline 10
   Tips of hind wings not hyaline 11

10. Fore wings with yellowish near base and along the costa ..... *variipennis*
    Fore wings wholly black ..... *jucunda*

11. Fifth ventral segment with erect hair in middle; much less erect hair on fourth and usually shorter 12
    Fourth ventral segment with mass of erect hair in middle, a little hair on sides of fifth; wings iridescent greenish to coppery ..... *vitripennis*
    Fourth ventral segment with a curved row across, the ends higher and incurving, between the ends of row the surface is smooth and polished ..... *nireus*

12. Last three to six joints of antennae rufous 13
    Not more than one or two joints rufous 14

13. Wings iridescent blue ..... *lynchi*
    Wings less iridescent, not blue, but somewhat reddish, hardly as deeply as *nigrescens* ..... *operosa*

14. The hair on fourth segment dense and almost as high as that on fifth segment ..... *crassicornis*
    The hair on fourth rather sparse, and little more than one-half as high as that on the fifth segment ..... *violaceipennis*

15. Fore wings with some yellowish or rufous 16
    Fore wings without yellowish or rufous 25

16. The pale confined to near front margin of fore wings 17
    The pale reaching across or almost across wing 18

17. A yellowish mark in apical half of second submarginal cell; antennae black; fourth ventral segment with erect hair on middle ..... *jujuyensis*
An elongate reddish spot near middle of costa ..... *andina*

18. Both wings almost wholly yellowish, narrowly dark at base and tip 26
Wings with more black, but not wholly black 19

19. Fourth ventral segment with a mass of erect hairs on middle .. 20
Other hair modification 21

20. The hair in a subtriangular area on apical half of segment; fore wings rufous in middle and reaching across; hind wing partly pale ..... *nero*
The hair area nearly a square, those on sides higher; fore wings with a rufous band before middle not quite reaching across; hind wings wholly black ..... *holmbergi*

21. Fourth segment with hair-comb on hind margin, a broad basal rufous or yellowish band ..... *dimidiata*
Fourth segment not so 22

22. Fourth ventral with a long pencil-tuft on each side far apart, no hair between; a pale yellowish or rufous band before or near middle ..... *completa*
Not so 23

23. Fourth ventral with tuft or erect hair each side 24
Fourth ventral with a curved row across base of segment, hairs on sides longer and directed backward and inward; nearly basal half of wing pale rufous ..... *dimidiatipennis*

24. A pale band on wings before middle, dark on base; tufts on venter coming to a point; tip of antennae rufous ..... *similis*
Wings broad, broadly pale yellowish in middle, basal half of hind wings black, anal lobe black; erect short hair on sides of third, fourth, and fifth segments, that on fourth denser and longer, curved inwards ..... *chrysoptera*

25. Hind wings hyaline on outer part, fore wings black; fourth ventral with short dense hair each side, slightly tufted, very short hair between, some hair also on sides of third and fifth ventrals ..... *deuteroleuca*
Hind wings not hyaline at tip, both pairs black 29

26. Tip of wings whitish hyaline, dark beyond cells; a loose mass of erect hair on middle of fourth ventral, the tips of outer hairs curving inward; end of marginal and third submarginal cells black ..... *pulchra*
Tip of wings dark 27

27. Body green, wings rather dark; no dark border to hind wings; hairs on first and second ventral segments short; hair on fourth mostly in front, often sloping backward, those on sides somewhat incurved ..... *sinnis*
Body blue; longer hairs on venter 28

28. Hind wings not bordered with brown ..... *neutra*
Hind wings with narrow, but distinct, brown border ..... *terebrans*

29. Antennae yellowish or rufous from near middle or base of third antennal joint 30
Antennae black, or the yellowish or rufous begins further out .. 38

30. Antennae pale yellowish, body slender; fourth ventral before tip with row on each side of hairs sloping backward, and depressed ..... *luteicornis*
Antennae more rufous; no such rows of sloping hairs on fourth ventral 31

31. A hair-comb along hind border of fourth ventral 32
No such comb, but tufts or groups of hairs 37

32. Wings mostly with bluish iridescence 33
Wings with the iridescence more reddish, violet, or greenish ..... *excelsa*

33. Body mostly green 34
Body blue, little if any green 35

34. Comb hairs about twice as long as width of subgenital plate ... *ruficornis*
Comb hairs but little longer than width of the subgenital plate .... *itapaca*

35. Comb hairs very short, hardly width of subgenital plate; no noticeable hair on third ventral segment ..... *amautas*
Comb-hairs plainly longer; at least a few fairly long hairs on second ventral segment 36

36. Posterior slope almost continues the slope of basal part, although there is a mid-ridge, the posterior slope plainly ridged ..... *sirene*
Posterior slope more steep, not or scarcely ridged, abdomen very slender ..... *mimetica*

37. Hair-tufts dense and tips curved inward ..... *cyanoptera*
Hair-tufts thin, wings not so iridescent ..... *nestor*

38. With a comb across tip of fourth ventral segment 39
No comb, but tufts, or curved row, or erect hair 41

39. Abdomen plainly with green above 40
Abdomen blue above ..... *ianthina*

40. Comb as high as tip of subgenital plate, latter widened toward tip; last joint of antennae rufous ..... *smaragdina*
Comb much lower and plate not widened towards tip, sides parallel ..... *erecta*

41. A mass of erect hairs arising from pits over all of the middle of fourth ventral 42
A curved row across base of fourth segment, the hairs on side are long, and the middle area of the segment smooth; sometimes side rows hardly connected at base 48

42. Wings brilliantly iridescent with blue, green, reddish or a mixture of color 43
Wings little, if any, iridescent 46

43. Fifth ventral segment with a terminal comb, fourth with erect mass, wings iridescent blue ..... *fulgidipennis*
Fifth ventral without a terminal comb; maybe group of hairs on far sides, usually very small 44

44. Wings strongly iridescent blue; fourth ventral with the erect mass, fifth with fine short hairs in middle and on sides ..... *amabilis*
Wings not wholly iridescent blue 45

45. Wings a marvelous mixture of all these colors, and changeable according to view ..... *margarete*
Wings mostly a reddish iridescent, not with shades of blue and green, fairly uniform ..... *nigrescens*

46. Basal joint of antennae plainly hairy below; head, thorax, and propodeum very hairy; propodeum with broad depression each side where the ridges are broken, except in front, abdomen blue, but greenish in some views; subgenital plate slender ..... *pilosa*
Basal joint of antennae not hairy from below 47

47. Last three joints of antennae rufous; abdomen very slender, but the basal segment tapers evenly toward propodeum; subgenital plate widened toward tip; tip of fore wings coppery (possibly abnormal) ..... *weberi*
Antennae wholly black; basal segment of abdomen becoming extremely slender, a petiole, the sides slightly concave, and the tubercle each side prominent ..... *chloe*

48. Surface between the ends or tufts of the curved row is punctate and with at least small hairs; the long side hairs are depressed, but meet in middle behind, the erect hairs are fine and low; abdomen green; antennae with three joints rufous; subgenital plate concave toward base and there with a median carina 51
Surface between tufts or ends of curved row smooth and polished, only hairs along anterior edge 49

49. The long hairs or tufts each side, their tips not nearly touching, connected at base by a row of small hairs 50
The tips of the oblique tufts reach or almost reach each other 52

50. Antennae black; head and thorax with very short hair..... *balloui*
Antennae with two joints rufous, wings a uniform brown; body slender; head, thorax, and propodeum with rather long white hair..... *angusta*

51. Antennae with three or four joints rufous; head (including clypeus) thorax, and propodeum with very short hair, mostly not nearly the diameter of an antennal joint; tuft each side on fourth ventral segment obliquely depressed..... *equatoriana*
Antennae wholly black, head, thorax, and propodeum with long hair; tufts erect, with incurving tips forming a high arch..... *modesta*

52. Last joint of antennae rufous, rarely more; subgenital plate slender, rounded at tip; hair on sides of pronotum longer than first antennal joint..... *seladonica*
Several joints of antennae rufous; subgenital plate broadened at tip, which is truncate; hair on lower sides of pronotum not as long as basal joint of antennae..... *schrottkyi*

Pepsis equestris Erichs.

Both sexes from northwest part of Trinidad; St. Augustine, Trinidad, 22 February, 25 March (N. A. Weber); foothills of Northern Range, Trinidad, 15 May (Weber); Cartagena, Colombia; Sevilla, Magdalena, 8 January, 25 March, 9 November, 1 December, and Rio Frio, Magdalena, 3 February, 19 June, 19 December, both Colombia and taken by George Salt.

Pepsis equestris var. lycaon Banks

Described from Trinidad, also specimens from Bucay, Ecuador, 4 October (Williams).

Pepsis vau-alba Smith

From San Goncallo, Brazil (St. John, Thayer Exped.); Maracajú, Matto Grosso, Brazil, April-May (Fairchild); Puty Piauhy, Brazil (Thayer Exped.); Redonda, S. Malheos, Brazil (Thayer Exped.); Independencia, Parahyba, Brazil, (Mann); Santa Cruz, Bolivia (Steinbach); Pedra Alagoas, Brazil, March (A. Maller) A. M. N. H.

Pepsis decorata Perty

Male and female; Potrerilios, Mendoza, Argentina, 18 to 20 March, 4,000 feet (Cornell Exped.); La Rioja, Argentina (Giacomelli, Cornell).

Pepsis decorata var. opposita var. nov.

Body black, more or less bluish, especially on abdomen; legs and antennae black; wings black with a streak of white, scale-like hairs along costal border out to end of marginal cell, almost silvery in places, in the marginal cell the streak occupies fully half of width; at base it does not reach base of wings; it is connected across wing to a similar white streak extending out to end of anal cell; the connection is not as distinct as in *decorata* and in some views somewhat yellowish, it is not as broad as in *decorata*; there is no white on end of first submedian cell. The basal vein is rufous, and at base of first discoidal cell bulges more basally than in *decorata* or allied species; the third submarginal cell is a little longer above than in *decorata*; on propodeum the mid-ridge is extremely low, scarcely noticeable (in *decorata* very distinct).

Length of fore wing 30 mm.

One female from Januaria, Minas Geraes, Brazil, (Jose Blaser). Type M. C. Z. no. 26698.

When male is known; this may prove to be a separate species.

Pepsis vitripennis Smith

A female from Colombia agrees closely with the original description, I doubt if Lucas has the right form. Male from Restrepo, Dept. Meta, Colombia (Bequaert) resembles the female; the fourth ventral segment has a mass of erect hair in middle, the hairs on end curve inward a little.

Pepsis amabilis Mocs.

Male and female; Rio Itaya, Amazon, Peru, December (Klug coll. Cornell); Puerto Bermudez, Rio Pishis, Peru, 13 to 19 July (Cornell Exped.); Iquitos San Rogue, Peru, December (Klug coll. Cornell); Tena, Ecuador, March (Williams).

Pepsis guaranitica Brèthes

Female; Santa Cruz, Bolivia (Steinbach). Agrees with a specimen from Missiones, Argentine, except that the last four antennal joints are rufous, instead of only two or three. Also both sexes from Campinas, Sao Paulo, Brazil, February, March (Williams); the male has a tuft of dense, low hair each side on fourth ventral, they do not curve to meet, and between are scattered shorter hairs; subgenital plate narrowed toward base, truncate at tip.

Pepsis fulgidipennis Mocs.

Male and female from Colombia; North West part of Trinidad (Ballou, Urich, and Fennah); Pointe au Pierre, Trinidad, 22 June (N. A. Weber); Estados Minas, Brazil (J. Blaser); Rio Itaya, Peru (Cornell).

Pepsis margarete Lucas

Male and female from Kartabo; Waratuk, 16 February, Arakaka, 21 December, all British Guiana, also Northwest part of Trinidad (Ballou, Urich, and Fennah); Rio Negro, Ost Colombia (Cornell).

Pepsis crassicornis Mocs.

Santa Cruz, Bolivia (Steinbach); Campinas, Sao Paulo, Brazil, February (Williams).

A female from Sao Paulo, Brazil, has the blue of the wings as in the male *crassicornis* and the lower part of stigma is longer than the first abscissa (as in male). The general structure much as in male; the vertex-width longer than second plus third antennal joints; the metanotum with scarcely a trace of carinae; propodeum not very hairy; with a low and broad mid-ridge, below is a median depression on the posterior slope, the middle of the area not ridged; tubercles fairly large and rounded; terminal ridge with distinctly elevated corners; mesosternal tubercle rather small but pointed; hind tibiae with the usual type of small, erect, pointed teeth, well separated and spines a little higher; mid and hind femora with short bristles above. In forewings the third submarginal cell has the end bent in middle; the base scarcely recurved above and then a long slope backward below; the second recurrent straight and sloping.

Pepsis nigrescens Smith

From Northwest part of Trinidad (Ballou, Urich, Fennah). Females and male.

Pepsis violaceipennis Mocs.

Male from Chapada, Brazil, and Lower Rio Tapiche, Peru, 27 July (Bassler) Amer. Mus. Nat. Hist.

Pepsis nireus Mocs.

Male from Santa Cruz, Bolivia (Steinbach).

Three females from British Guiana (Kartabo, Arakaka, and Tumatumari) may be females of *nireus* or possibly *violaceipennis*. The wings are rather broad, not so iridescent as *violaceipennis*, the base of marginal cell is very oblique, which is more like *nireus*; the lower side of stigma is a little shorter than the first abscissa (unlike the males); the base of third submarginal cell as oblique as in *violaceipennis*. The tubercles are moderately low and rounded; the mid-ridge low and broad, the posterior slope nearly flat across, but from each end of mid-ridge a faint ridge extends obliquely outward to near outer corner of terminal ridge, forming an area fully twice as wide below as above, this area is faintly ridged; the teeth on hind tibiae as in allied forms.

Pepsis operosa Brèthes

From Villarica, Paraguay (Schade), Buenavista, near Santa Cruz, Bolivia (Cornell Univ.); Campinas, Brazil, March (F. X. Williams).

The female is similar to male in color and general structure and venation, except that the lower side of stigma is a little shorter than first abscissa; the base of third submarginal cell is rounded above, then slopes back on lower part, while the end of cell slopes outward for over halfway and the lower part rounded back. Lateral ocelli nearly twice as near each other as to eyes; shoulders quite prominent, rounded and sparsely haired. Metanotum carinate each side of groove; propodeum with basal part well separated by a fairly low ridge from the posterior slope; below the mid-ridge there is a rather depressed area, with parallel sides, the sides of which show the ridges; terminal ridge scarcely elevated at corners; both tubercles of moderate size, rounded; mesosternal tubercle fairly sharp; mid and hind femora with short bristles above, hind tibiae with the row of small, erect, well-separated teeth, the spines scarcely higher.

Pepsis lynchi Brèthes

Males from Santa Cruz, Bolivia, and Buenavista, near Santa Cruz, Bolivia, both from Steinbach.

This is structurally close to *operosa*, but the wings iridescent blue, and more slender, abdomen also more slender.

Pepsis holmbergi Brèthes

Males from Province Sara, Bolivia and Santa Cruz, Bolivia (Steinbach); Buenavista, near Santa Cruz, Bolivia (Cornell Univ.).

Pepsis variipennis Lepel.

Male and female from Chapada, Brazil, October (H. H. Smith); Maracajú, Matto Grosso, April-May (Fairchild).

Pepsis dimidiatipennis Brèthes

Male from Flores, Manaos, Amazonas, Brazil, 2 August (Bequaert).

Pepsis completa Smith

Males and females from Canto Gallo, Brazil (Dr. Teuscher, Thayer Exped.); Chapada, Brazil, March (Smith); Maracajú, Matto Grosso, Brazil, April-May (Fairchild); Samipato, Bolivia (Steinbach); Paso Fundo, Argentina (Cornell Exped.); Belem, Para, Brazil, June, and Jabaty, Para, Brazil, May (Both from F. X. Williams).

Pepsis similis Lucas

Male from Vista Nieve, Santa Marta, Colombia, 5,000 feet., 10 February (G. Salt).

Pepsis (Brethesia) dimidiata Fabr.

Male and female from Rio Frio, Magdalena, Colombia, 3, 15, 31 July, 7 August (G. Salt); Cerro Patron, Rio Frio, Magdalena, Colombia, 4,000 feet, 12 September (Salt); Jamonical, Santa Marta, Colombia, 23 December (Salt); Kangaruma, British Guiana, 15 November; Zanderji, Boven, Para District, 27 April (Cornell); St. Laurent, Guyane (Cornell); Buenavista, near Santa Cruz, Bolivia (Cornell); Sao Paulo, Brazil, Campinas, Sao Paulo, Brazil, February, March (F. X. Williams); and Rockstone, July, Kaieteur, 31 July, Rupunini, September, all British Guiana (Amer. Mus. Nat. Hist.).

Pepsis excelsa Lucas

Male and female from Forest Settlement, Rio Mazaruni, August-September (N. A. Weber); Kartabo, 11 March, 8 October; George-

town, 15 February; West bank of Demerara River 5 January; Penal Settlement, all British Guiana; Teffe, Brazil, 25 March (Bassler) A. M. N. H.

Pepsis transversa Brèthes

Female from Maracajú, Matto Grosso, Brazil, April-May, (Fairchild).

There is a median carina on the mesonotum; very little hair on head or thorax.

Pepsis karschi Lucas

Female from Tacuru-Pucu, Paraguay, 2 to 7 April, (Donald Wees).

Pepsis foxi Lucas

Male from Chapada, Brazil, March. Probably the male of *karschi*.

Pepsis diana Mocs.

Female; Santa Cruz, Bolivia (Steinbach); Iquitos San Rogue, Peru, January, March (Klug coll. Cornell); San Juan, Col Perene, Peru, 23 June (Cornell Exp.); El Campaniento, Col Perene, Peru, 23 June (Cornell).

Pepsis pulchripennis Mocs.

Female; Buenavista near Santa Cruz, Bolivia (Steinbach); Urucum, Corumba, Brazil, December (Harris, Cornell); Chapada, Brazil (H. H. Smith); Northwest part of Trinidad (Cornell); Rio Cairy, Uaupes, Amazonas, Brazil, 20 December (Schmidt coll. Amer. Mus. Nat. Hist.).

Pepsis nero Lucas

Female; Villa Rica, Paraguay, January, May, December, male from Joriana R. O. del Uruguay (Cornell coll.) and probably identified by Brèthes.

Pepsis diabolus Lucas

Female; Kartabo, British Guiana, 24 May.

Pepsis itapaca spec. nov.

Female. Body black, with a little greenish iridescence, particularly on abdomen above, first segment polished. Antennae brownish yellow, first and second joints black; legs black, all femora and tibiae plainly blue above; fore wings black, shining, in places with slightly greenish or bluish iridescence; hind wings dark brown; veins black. Clypeus with hairs near lower margin, front and vertex with a few hairs each side near eyes, long, but scattered hairs on back of head; pronotum with a little short hair above; a few hairs on pleura; propodeum above and on sides with long, but not dense, hair; coxae also long-haired; tip of abdomen above bristly and below hairy, little hair on rest of venter.

Clypeus angularly emarginate in middle of lower margin; face a little narrowed above, from in front vertex is rounded a little above eyes, ocelli almost at tip, a slight transverse groove back of ocelli, laterals only a little nearer to each other than to eyes; antennae short, second plus third not equal vertex-width; pronotum nearly vertical in front, scarcely angulate behind; propodeum with a short mid-ridge, basal part slightly convex, with many cross-ridges, rather even, posterior part steeply sloping, striate, but some are broken in middle; abdomen broad and high near base. Front tibiae about as long as width of head, basitarsus with comb of stout spines; hind tibiae with inner row of short, small teeth, and much higher stout spines, outer row of equally long spines, inner spur not one-third of basitarsus, last tarsal joint a little curved, tooth much before middle of claw, two straight bristles before it.

In fore wing the marginal cell fully two-thirds its length from wing-tip; second submarginal cell fully twice as long below as broad, base moderately sloping, tip little curved, third submarginal more than two-thirds of second below, narrowed less than one-third above, outer side sloping, then curved, receiving the second recurrent vein (scarcely curved) at or near the basal third; in hind wings the anal vein ends about one-half way from cubital forking to margin.

Length of fore wings, female 25 mm.

The male has the body much more blue than female, the abdomen above brilliantly blue; antennae yellowish from base of third joint out, wings as dark in color; the venation very similar, the third submarginal cell shorter, sometimes broader than long, and in hind wings the anal vein ends nearer margin of wing.

Body very slender, lateral ocelli about one and one-half times as

far from eyes as from each other; front and vertex hairy, and clypeus above; pronotum rather densely hairy, but not long; propodeum tapering behind, sloping from in front, hairy above and with many cross-ridges, a mid-ridge, also a prominent tubercle each side, and one below stigma; posterior slope short, not steep, more faintly ridged; hind basitarsus with a low crest not concealing the bristles; the fourth ventral segment with a comb of hair on hind margin, fairly long hairs and those near ends with curved tips; the subgenital plate but little narrowed at base, two and one-half times as long as broad, tip truncate.

Length of fore wings, ♂ 17 to 22 mm.

From Nova Teutonia, Santa Catharina, Brazil, 22 December, 6 January, 13, 22 November.

Type M. C. Z. no. 26696.

Resembles *P. excelsa* but in the female there are many long hairs on the basal part of propodeum, the clypeus is more angularly emarginate, the mesosternal tubercle not as large; in the male the comb at tip of fourth segment is of much shorter hairs than in *P. excelsa*.

Pepsis alceste spec. nov.

Black, with a bluish sheen, most brilliant on the abdomen, the clypeus, in some views, violet. Antennae with five to seven apical joints, yellowish to rufous. Wings pale brown to yellowish brown, the veins, except in basal part yellowish and bordered with pale yellow. Clypeus broadly concave below, hairs mostly on lower part; vertex of normal elevation, front with few long hairs each side by eyes and a few scattered in middle; third joint of antennae equal to vertex-width; lateral ocelli about one and one-half times as far from eyes as from each other. Pronotal shoulders not prominent, a few hairs above, none on lower lobes.

Propodeum with stigmal tubercle low, rounded; lateral tubercles small, but moderately high; mid-ridge low, but fairly broad, before it some ridges go across, others broken on sides, behind are a few ridges in the middle; the propodeum above has rather dense, short pubescence, and quite numerous long hairs; long hair on sternum and coxae; mesosternal tubercle at base of a rather long coxal slope.

Abdomen moderately slender, basal segment polished, shining; last segment with numerous bristles and a few short hairs on the preceding segment; venter with only a few scattered hairs, mostly in rows, last segment convex and hairy all over.

Legs slender; teeth on hind tibia triangular, rather small, mostly

well separated, the stout spines only a little longer than teeth, and the bristles also not much longer; inner spur of hind tibia about one third of basitarsus; tooth on claws before middle.

In fore wing the third submarginal is much widened at end of second recurrent, latter almost straight and ends about two-fifths the way out, base of third submarginal scarcely oblique, the end of cell an even but slight curve. On the ridge over base of insertion of hind wings are yellowish hairs (as in *diana* and *niphe*) and in general it is closely related to those species, but the paler wings and bordered veins and more hairy propodeum separate it.

Length of body 27 to 32 mm. of fore wings 26 to 30 mm.

From Iquitos, San Rogue, Peru, March, April, July (Klug coll.). Type in Cornell Univ., paratypes there and in the M. C. Z. no. 26195.

Pepsis ataraqua spec. nov.

Very similar to *P. guaranitica* Brèthes, but a little smaller, with shorter and rather broader wings, darker and less iridescent. The last two or three antennal joints are rufous; vertex evenly rounded, third antennal joint not equal vertex-width; lateral ocelli twice as far from eyes as from each other. Propodeum with about seven to nine striae before mid-ridge and a few finer near base; mid-ridge high and convex, sparse long hairs on propodeum.

In the fore wing the third submarginal cell is shorter than *guarantica*, and the second recurrent (slightly curved) ends before end of basal third of third submarginal cell; the first recurrent is little if any longer than the upper base of the second submarginal cell.

From Santa Cruz, Bolivia (Steinbach). Type M. C. Z. no. 26194.

Pepsis amautas spec. nov.

Male. Black, some bluish on head, thorax, propodeum above, coxae, and a strong blue iridescence on abdomen above, less plain on venter; legs black, antennae black on base, and mostly brown above beyond base, but below yellowish brown. Wings wholly dark brown, vein black. Head hairy, hairs on face not very long, nor those on clypeus, but back of eyes very long hair; pronotum and propodeum with moderately long hair, pleura and sides of propodeum hairy; abdomen without hair except a little on venter.

Body very slender. Clypeus with an angulate emargination in middle of lower edge; antennae moderately stout, joints but little

swollen below; lateral ocelli not quite twice as near each other as to eyes; pronotum nearly vertical in front; propodeum with lateral tubercles and those below spiracles very low, scarcely noticeable, no mid-ridge, posterior part low and only slightly separated from the long basal part, latter with many cross-ridges, some angulate in middle; abdomen slender, fusiform, basal segment much longer than broad behind, fourth ventral segment with a dense comb of short, erect hair on hind margin, the hairs toward ends shorter than those near middle; subgenital plate small and slender, tip almost truncate, basal half of venter blue, last three segments black, smooth and shining, fifth on each side with a small hook. Legs slender, hind tarsi with fringe above on basitarsus but not quite high enough to conceal the bristles.

In fore wings the marginal cell about two-thirds of its length from wing-tip; second submarginal cell more than twice as long below as broad, base very oblique, tip scarcely so, but curved near upper end; third submarginal cell about two-thirds of second below, about one-half as long above, outer side strongly sloping at first then curving in to lower side of cell, the second recurrent ends a little before middle; in hind wings the anal vein ends as near margin as to forking of cubitus.

Length of fore wings 20 mm. A male from Ninabamba, near Ayacucho, Peru, 1900 m. December (Weyrauch). Type M. C. Z. no. 26695.

Pepsis angusta spec. nov.

Male. Body green; head, thorax and propodeum with white hair; legs black; antennae black, two joints rufous; wings an even brown all over; clypeus wholly green, with moderately long hair all over. The head very similar to *P. festiva*; the pronotum also; propodeum more slender, no distinct median groove, the ridges hardly as heavy as *festiva*, the posterior slope is closely, finely, and obliquely striate each side; the lateral tubercles higher than in *festiva*.

The abdomen tapers evenly at base; the fourth ventral segment has a loose tuft each side, not as high as in *festiva*, widely separated, and a few fine hairs connecting along base, the fifth segment also has a few erect hairs each side, also widely separate; the subgenital plate is narrow at base, much widened to the truncate tip, which has some long hairs.

Venation similar to *festiva*, the third cell about the same, but second recurrent ends nearer to middle, the first abscissa is longer than in

festiva, and the stigma also longer, below almost equal abscissa one; the basal vein ends much further before the transverse than in *festiva*.

Length of fore wings 20 mm.

One male from Colombia (probably Bogota) Felix Ovallo (A. M. N. H.). In appearance closely like *P. festiva*, except for the uniformly brown wings.

Pepsis balloui spec. nov.

Male. Black, antennae black, also legs and wings. Body bluish, wings with faint bluish iridescence. Hairs all short, hardly as long as width of an antennal joint; clypeus arcuate below; hind ocelli about twice as near each other as to eyes; propodeum rather long, especially the basal part, with median furrow, lateral depressions almost absent and the ridges crossing; mid-ridge moderately long and high, posterior slope short, not plainly ridged, mesosternal tubercle low, projecting laterally; lateral tubercles lightly elevated and crossed by ridges, basal tubercles also very low.

First segment of abdomen evenly tapering in front, a low rounded tubercle each side; fourth ventral with a curved row of hairs across base, basal hairs low, the end tufts wide apart, not very high, obliquely incurved, but not nearly reaching each other, most of middle of segment smooth and polished; low hairs on rest of venter; subgenital plate rather slender, somewhat narrowed toward base, tip rounded, only minute hairs.

In the fore wings the lower side of stigma longer than first abscissa; top of third submarginal cell shorter than base, latter curved and sloping back, outer side sloping at first then recurved a bit before end, lower side not quite twice the upper, second recurrent ends plainly before middle; basal vein ends more than one-half of transverse before transverse. Length of fore wings 23 mm.

From northwest part of Trinidad (Ballou, Urich, Fennah). Type M. C. Z. no. 27349.

Pepsis equatoriana Brèthes

Male from Huigra, Ecuador.

Antennae dark brown, three joints rufous; abdomen green; on fourth ventral the erect hairs in middle are very low, the long side hairs are depressed, meeting in middle behind; subgenital plate concave toward base and there with a median carina.

Pepsis ruficornis Fabr.

Females from northwest part of Trinidad (Ballou, Urich, and Fennah); Kartabo, British Guiana, 20 April; November (Cornell); Zanderij, Boven, Para Distr., Surinam, 24, 27 April (Cornell); Bucay, Ecuador, 1000 ft., 4 October (F. X. Williams); Caripito, Venezuela, from 24 April to 22 August (W. Beebe).

Pepsis ruficornis was described from "America meridionale." The species common in Cuba, Hayti, has been identified, until now, as *ruficornis*. The male of the Antillean species is well known, and has hair-tufts on the fourth segment. Females occur in northern South America very close, almost indistinguishable from the Antillean form, but I have not, as yet, seen a male from South America that agrees with the West Indian males. Lucas does not say that he had a male from South America. I have seen males taken at same time and place as *ruficornis* and presume that they are males of *ruficornis*, since they agree except in sexual characters. These males are probably what Lucas calls *P. sapphirus*, a species described from San Domingo, though given by him as in South America. In his tables for females he omits *sapphirus* although he gives a description of female as well as male. The West Indian species should be called *P. sapphirus* Palisot de Beauvais.

Pepsis luteicornis Mocs.

Males, British Guiana. Propodeum and each side of scutellum with dark yellowish pubescence. Hind ocelli nearly twice as near each other as to eyes. The propodeum shows no clear separation of basal and posterior parts, each side is a broad furrow from base to tip in which the cross-ridges are faint; no definite lateral nor basal tubercles. Venter is smooth and shining; at each anterior corner of the fourth segment is a triangular group of punctures from which arises a few long hairs, obliquely curving inward; the sixth ventral shows a slight carina on middle of apical part; close to lateral margins of fourth, fifth, and sixth segment is a row of small black hairs.

The tip of propodeum has the terminal ridge high, but the corners square, not projecting and in middle scarcely emarginate. The third submarginal cell is much like figure 120 of Lucas.

Pepsis floralis Lepel.

Females from Campinas, Sao Paulo, Brazil, February (Williams) agree with the description which is not very definite.

Body black, legs also, antennae black with last four joints rufous; wings dark brown, tip barely paler, slightly iridescent blue, veins black; hair all fairly short, except longer on coxae and a few on venter, those on propodeum mostly sloping. Clypeus arcuate in middle below; vertex but little elevated, a groove back of ocelli, lateral ocelli fully twice as near each other as to eyes; second plus third joints of antennae about equal to vertex-width; propodeum much as in *ruficornis*, the basal tubercles low, rounded, the lateral tubercles as small as in *ruficornis*, mid-ridge distinct, posterior slope very steep, the ridges there faint; terminal ridge with corners higher than in *ruficornis*; mesosternal tubercle fairly strong and sharp, projecting somewhat laterally; abdomen and legs like *ruficornis*; venation also like that species, lower side of stigma fully equal to first abscissa; upper side of third cell not as long as basal, latter but little curved, outer side at first sloping, then bending down to end, lower side not twice the upper, second recurrent ends a little beyond basal third; legs and teeth on hind tibia much like in *ruficornis*.

Length of fore wing 23 mm.

Differs from *ruficornis* principally in the less amount of rufous on antennae.

Pepsis pilosa spec. nov.

Male. Black, mostly with bluish sheen, but in certain views greenish, legs black, antennae also, (at least seven joints); wings black.

Clypeus with long hair all over, and densely long-haired on rest of head, thorax, and propodeum, long hairs on front femora below; basal joint of antennae plainly hairy in front. Propodeum with broad depression each side where the ridges are weak or absent, except in front. Abdomen moderately swollen in middle; the inner spur of hind tibia about two-fifths of basitarsus.

The third cell is much shorter at top than at base, latter strongly curved, almost angulate in middle, lower side almost twice upper, no spur-vein, outer side of cell strongly sloping for upper two-thirds then turns almost at angle backward. Abdomen moderately swollen in middle, first segment tapering to base; the inner spur of hind tibia about two-fifths of basitarsus.

Length of fore wings 20 mm.

From Mt. Duida, Venezuela, 14 June (Amer. Mus. Nat. Hist.).

It may be a male of some Trichopepsis.

Pepsis weberi spec. nov.

Male. Black, body with blue sheen, legs black to purple, antennae last three joints rufous; wings evenly dark brown, fore with tip pale coppery (may be accidental).

Body slender; clypeus with a small indentation on lower margin, with short hair, very short hair on front, vertex, also pronotum and propodeum, longer on pleura and coxae; propodeum from side an even curve, but last ridge of basal part separates the posterior slope, which has very faint or no ridges; basal part with broad depression each side where the ridges are broken or weak; mesosternal tubercle only an angle, basal and lateral tubercles very low, only to be noted in oblique view.

Abdomen very slender, sides nearly parallel, basal segment tapers to base; the groove of second ventral is slightly indicated on each side; fourth segment with a band of scattered erect hairs across apical half, the side ones incurved a little. The subgenital plate slightly widened at the truncate tip; legs slender, inner spur about two-fifths of basitarsus.

The stigma below is hardly as long as first abscissa; top of third cell as long as base, latter curved back only a little, outer side evenly curved, second recurrent ends a little beyond basal third; basal vein ends less than one-half of transverse before transverse.

Length of fore wings 16 mm.

One male from Nariva swamp, Trinidad, 5 December (N. A. Weber). Type no. 27348, M. C. Z.

Pepsis chloe Brèthes

Males from Jujuy, Argentina, 11 February (Cornell Exped.).

Pepsis seladonica Lucas

Males from Province Sara, and Santa Cruz, Bolivia (Steinbach).

Pepsis schrottkyi Brèthes

Male from Villa Rica, Paraguay, January, November, December (Cornell).

Pepsis fluminensis Brèthes

From Villa Rica, Paraguay, November (Cornell).

Pepsis jucunda Lucas

Forest Settlement, Rio Mazaruni, British Guiana, August, September (Weber); Blairmont, Berbice, British Guiana (Box coll.); St. Augustine, Trinidad, 1 June (Weber); Maracajú, Matto Grosso, Brazil, April-May (Fairchild); Brazil (Thayer Exped.); VistaAlegre, Rio Branco, Amazonas, Brazil, 6 September (Bequaert); Rockstone, Essequibo Riv., British Guiana, 26 June (Cornell); Caripito, Venezuela, from 23 April to 30 August (W. Beebe).

Pepsis deuteroleuca Lucas

Males and females from Villa Rica, Paraguay (Schade); St. Laurent, Guyane.

Pepsis spegazzinii Brèthes

Male; Cosquin, Sierra de Cordoba, 1 to 9 March, (Cornell Exped.); Potrerilios, Mendoza, 4,000 ft., 16 to 20 March (Cornell), both Argentina.

Pepsis janthina Erichs.

Females from Kartabo, Bartica, British Guiana, 5 June, 8 July; Sao Paulo, Brazil; Province Sara, Bolivia (Steinbach); Jatun, Yaco, Rio Napo watershed, Ecuador, 700 m. (MacIntyre); Iquitos San Rogue, Peru, June, March (Klug coll., Cornell); Iguazu Falls, Argentina, 20 to 22 January (Cornell Exped.); Tena, Ecuador, 23 February, (F. X. Williams). *P. hora* Brèthes is near, possibly the same; the amount of iridescence and greenish or bluish is apt to vary.

Pepsis janira Brèthes

Females from Cosquin, Sierra de Cordoba, Argentina, 1 to 9 March (Cornell Exped.).

Pepsis helvicornis Lucas

Female from Bahia, Brazil, 2 July 1874 (J. Russell).

Pepsis sphinx Lucas

Male and female from Galeota Point, Trinidad, 25 November (N. A. Weber); St. Augustine, Trinidad, 6 July (Weber); Northwest part of Trinidad (Ballou, Urich, and Sennah); Rio Frio, Magdalena,

5 December, 2 August (G. Salt); Sevilla, Magdalena, 14 March, 9 May (G. Salt), both Colombia; and Restrepo, Dept. Meta, Colombia, 500 m. (J. Bequaert); Zanderji I., Boven, Para Distr., Surinam, 27 April (Cornell).

Pepsis smaragdina Dahlb.

Male and female from Rio de Janeiro, Brazil, November (Thayer Exped.); Nova Teutonia, Santa Catharina, Brazil, 30 May (Plaumann); Campinas, Sao Paulo, Brazil, March (F. X. Williams); Tijuca Preto, Esp. Santo, Brazil, (A. Maller) Amer. Mus. Nat. Hist.).

Pepsis kohli Lucas

Male and female from Santa Catharina, Brazil (Cornell).

The male (*Pepsis modesta* Brèthes) has a row of incurved hairs on each side of the fourth ventral segment; subgenital plate short, widened and rounded at tip; hind tibiae compressed, but the crest of hairs above is very low.

Pepsis nigricornis Mocs.

Females; Buenavista, near Santa Cruz, Bolivia (Cornell); Huscapistana to San Ramon, Peru, 3 June (Cornell), Huscapistana to Col Perene, 4 to 7 June (Cornell);

Pepsis gallardoi Brèthes

Female; La Chorrera to La Sombra, Putumayo Distr., Peru, 17 to 20 August (Cornell Exped.); Maracajú, Matto Grosso, Brazil, April-May (Fairchild).

Pepsis vinciens Lucas

Female; Santa Cruz, Bolivia (Steinbach).

Pepsis niphe Mocs.

Female; Bartica, British Guiana, 8 May.

Pepsis nestor Mocs.

A male from Caripito, Venezuela, 9 July (Beebe coll.). Resembles *ruficornis*; antennae rufous from base of third joint; body greenish, iridescent above; clypeus more deeply angulately excised on lower

margin, only few fine hairs above, hair on head about as in *ruficornis*, also thorax and coxae. Body as slender as *ruficornis* and femora a little more so. Propodeum with many fine ridges, much as in *ruficornis*, the two parts not as plainly separated, and posterior slope a little less steep, with some hairs above; abdomen, legs, and claws as in *ruficornis*.

Venter only slightly hairy, fourth, fifth, and sixth segments polished; fourth segment with a curved row of hairs each side, sloping inward and tips somewhat elevated, the outer end some distance from hind margin of segment; subgenital plate not very long, sides nearly parallel, tip nearly truncate.

Text fig. 1. Third submarginal cell.

The fore wings are rather more slender than in *ruficornis*; venation about the same, outer side of third submarginal cell lightly and nearly evenly curved, not bent; the cell not longer than in some *ruficornis*; there current ends a little before middle.

Pepsis pallidicornis Mocs.

From Iquitos San Rogue, Peru, July (Klug coll., Cornell).

Pepsis cyanoptera Lucas

Female from Agua Dulce, San Lorenzo Mt., Colombia, 24 December (J. Bequaert).

Pepsis erecta Brèthes?

Male from La Chorrera, Putumayo Distr., Peru, 17 to 20 August (Cornell Exped.); near La Sombra, Putumayo Distr., Peru, 21 August (Cornell Exped.); Coroico, Bolivia. (Probably this species).

Pepsis mimetica Brèthes

Male from La Chorrera, Putumayo Distr., Peru, 17 to 20 August (Cornell Exped.).

Pepsis roberti Brèthes

Male from Cosquin, Sierra de Cordoba, Argentina, 1 to 9 March (Cornell Exped.).

Pepsis brunneicornis Mocs.

Male from Rio Grande do Sul, Brazil.

Pepsis hecate Mocs.

From Tumatumari, British Guiana (Cornell Univ.).

Pepsis ferruginea Lepel.

Females from Partidas, Cincinnati, San Lorenzo Mt., Colombia, 1 January (J. Bequaert); also from Venezuela, September (Lichy).

Pepsis prixi Brèthes

Several males from Villarica, January and December (Cornell Univ.)

Typical *prixi* has, on the subgenital plate, a transverse ridge parallel to the apical ridge.

A variety *P. prixi* var. *gemella* var. nov. is smaller and has a dark streak over submedian cell close to hind border; the subgenital plate has the transverse ridge very low, angulate in middle, and placed much further than usual before the apical ridge, which also is very low and has the sides projecting laterally in an angle. The ridges on the propodeum are very fine, the mid-ridge extremely small, practically absent; ocellar triangle broader than in typical form, the lateral ocelli but little further from eyes than from each other.

Fore wing, length 9.5 mm.

From Villarica, Paraguay, November (Cornell).

Pepsis fuscobasalis Brèthes

Male from Moliniascue, Paraguay, October (Schade). The base of both wings, including anal lobe of hind wing, is black. The transverse groove on second ventral segment is distinct except on sides;

some long hair on second ventral; third ventral with little short hair, four ventral with a loose mass in middle, much as in *sinnis*, the hairs on sides not so much longer than others, fifth ventral polished but with scattered minute punctures and fine, short hairs, those at extreme sides longer. Both basal and lateral tubercles long, the basal low, the lateral high, end reaching back over posterior slope, inner side with the ridges continued from dorsum; mid-ridge short but fairly high; posterior slope slightly concave, with cross-ridges; terminal ridge moderate, corners rather prominent, middle part with three parallel ridges; hair on propodeum rather long, especially near turn.

Pepsis terebrans Brèthes

Probably identified by Brèthes, male from Bolivia. Also from Jujuy, Argentine, February (Harris, Cornell Univ. Exped.).

Pepsis pulchra Brèthes

Males from Villa Rica, Paraguay (Schade, Cornell Univ.).

Pepsis neutra Brèthes

Males from Jujuy, Argentine, 11 February (Cornell Univ. Exped.).

Pepsis corduvensis Brèthes

Females from Cordova, Argentine (Davis).

Pepsis jujuyensis Brèthes

From Buenavista, near Santa Cruz, Bolivia (Steinbach, Cornell Univ.).

Pepsis mancoi spec. nov.

Female. Body, legs and antennae black; wings ferruginous, base of fore wings black for a short distance, at end of closed cells is a narrow curved brown band starting from end of marginal cell and passing just beyond third submarginal cell around to hind margin and ending at end of anal vein, the apical part of wing beyond this is whitish hyaline; in hind wings the base is scarcely as much black as in fore wings, anal lobe black and the black extending out along hind border, also a brown band occupying most of apical part of wing, the extreme tip being a little paler; veins mostly rufous. Head,

thorax, most of pleura, and coxae hairy, some on venter, and tip of abdomen above and below with many hairs and bristles; propodeum above with dense, short black hair, and longer sparse hairs.

Lower margin of clypeus evenly and shallowly concave; face but little narrowed above, from in front the vertex is nearly straight across, barely above eyes, lateral ocelli in line of top of eyes, and nearer to each other than to the eyes, a transverse depression from eye to eye just above ocelli; antennae very short, second plus third joints not quite equal to vertex-width; pronotum steep in front, behind nearly angulate in middle; propodeum plainly separated in two parts by a low and long ridge, the basal part hairy and striate, posterior part concave, more finely striate, stigmal tubercle small but pointed.

Abdomen broad and elevated near base, slightly constricted between first and second segments. Legs moderately short, front femur scarcely longer than width of head, basitarsus with comb of very stout spines; hind tibiae with an inner row of small teeth, short spines and bristles near by, outer row of moderately long stout spines; inner spur about one-third of basitarsus, the last tarsal joint curved, the claws with tooth a little before middle, and two or three stout bristles before it.

In fore wings the marginal cell almost its length before tip; second submarginal cell about twice as long below as broad, base oblique, end curved; third submarginal only about one-third longer below than second, but much broader, top about two-thirds of bottom, end curved, but little sloping, second recurrent (slightly curved) ending near middle; in hind wings anal vein ends nearer to forking of cubitus than to margin.

Length of fore wings 25 mm.

One female from Ninabamba, near Ayacucho, Peru, 1900 m., December (Weyrauch coll.).

Type M. C. Z. no. 26692.

Pepsis rubra Fabr.

A female from northwest part of Trinidad (Ballou, Urich, Fennah) does not differ from typical Antillean specimens.

Pepsis chrysoptera Burm.

Male from La Rioja, Argentine (Cockerell).

Below is a table for males that have a modified subgenital plate, not the normal type of *ruficornis*. Usually there are no hair-modifications. These forms belong to various groups; there are others that will go here, but I have not seen them.

1. Subgenital plate crossed by a ridge, usually transverse and parallel to the apical ridge, sometimes angulate or curved in middle 2
   Subgenital plate not crossed by a transverse ridge other than apical ridge 13
2. Wings largely black or with snow-white tip, or white spots or streaks toward base 3
   Wings not black with white tips or spots; with rufous or yellowish, or silvery, or golden 6
3. Tip of fore wings black as rest of wing, but pale spots and streaks near base 4
   Tip of fore wings white 5
4. A silvery spot before base of third discoidal cell; on the plate the two ridges parallel and rather close together, apical ridge not notched ..... *vau-alba*
   No silvery spot before base of third discoidal cell; the apical ridge curved back on each side, inner ridge low but higher in middle, tooth-like ..... *decorata*
5. A white band across base of fore wings; the two ridges parallel, apical one rather narrow and notched in middle ..... *equestris*
   No white band across base, tip broadly white ..... *insignis*
6. Tip of fore wings hyaline-whitish, or at least plainly pale 7
   Tip of fore wings dark 11
7. Wings silvery or golden, no rufous or red; basal third or half of hind wings black; plate small with a low cross-ridge parallel to low apical ridge antennae; head and thorax very hairy ..... *petiti*
   Wings not silvery, nor golden 8
8. Fore wings broadly black on basal part, bright red spot occupying hardly one-third of wing; hind wings mostly dark, subgenital plate small, two parallel ridges, apical one notched in middle (much like *equestris*) ..... *rubra*
   Fore wings only narrowly or not at all black on base, the pale (rufous or yellowish) occupying more than one-half of fore wings; hind wings pale, at least in middle 9
9. Subgenital plate very broad, semicircular, with a slightly elevated apical rim and a curved ridge near middle, wings mostly

reddish or ferrugineous ..... *atrata*
Subgenital plate not broad, semicircular, with a cross-ridge; wings more yellowish 10

10. The cross-ridge lower, apical one straight across tip and corners project laterally in a sharp point; paramere rounded at tip and below with short dense hair ..... *prixi*
Both cross-ridges high, the apical one concave on tip, corners not projecting laterally; paramere pointed; and underside with long, erect bristles ..... *staudingeri*

11. Subgenital plate long, with two high, parallel ridges close together, apical one concave on tip, no white near base of fore wings ..... *inclyta*
Subgenital plate with ridge-tip lobe-like each side 12

12. Most of fore wing dark and tip no darker; yellowish near base, especially in hind wings; inner ridge low ..... *foxi*
Most of fore wing rufous to yellowish, a black border, sometimes white mark near the basal black ..... *flaminia*

13. Subgenital plate with a large median tooth near base; wings mostly yellowish to rufous with a black tip; often some white near basal black of fore wings ..... *reaumuri*
No large median tooth near base of subgenital plate 14

14. Subgenital plate with a median longitudinal carina or a submedian pair, divergent toward base, not covered with long, dense hair 15
No distinct longitudinal carina on plate 19

15. With a submedian pair of carinae, connected near tip, divergent near base; wings yellowish hyaline; head and thorax very hairy ..... *tolteca*
Wings largely or wholly black, a median longitudinal carina on subgenital plate 16

16. Wings wholly black, large species; carina ends before tip in a tooth ..... *elevata*
Wings with a white tip, which does not reach the third submarginal cell 17

17. Tip of hind wings as well as front wings white; carina high near base, runs out before tip ..... *albolimbata*
Tip of fore wings only white 18

18. The carina ends near middle of plate ..... *venusta*
The carina reaches almost to tip of plate ..... *cyanosoma*

19. Subgenital plate broad flattened or even slightly concave, always broader than the typical plate of *Pepsis ruficornis*

and allies 20
Subgenital plate not broad nor flattened 31

20. A yellowish or golden band on tip of nearly all segments of abdomen, latter very slender 21
No such band except on the basal segment, usually none there 22

21. Wings wholly dark brown to black ..... *speciossisima*
Wings paler, subhyaline; plate broad at base, but beyond a large subconical lobe ..... *aurozonata*

22. Wings wholly dark brown to black, a golden band across tip of first segment of abdomen, abdomen not slender ..... *sumptuosa*
Wings not wholly dark 23

23. Wings black, fore wings with a broad snow-white tip; subgenital plate moderately broad 24
Wings not black, rufous, yellowish, or more or less subhyaline 25

24. Subgenital plate with punctures nearly equally dense all over, tip not concave, and with brown hair ..... *egregria*
Subgenital plate with few punctures near base, very dense on apical part, tip slightly concave and with black hair ..... *pretiosa*

25. Legs except femora wholly yellowish; much golden hair on body ..... *aurifex*
Legs black 26

26. Plate much broader than long, the hairs mostly near middle of length, surface rather elevated across middle; wings strongly rufous ..... *eubule*
Plate little if any broader than long 27

27. Tip of plate angulately emarginate in middle; wings rufous ..... *astarte*
Tip of plate not emarginate 28

28. Wings greenish hyaline; abdomen very slender; plate not broad, hardly more than normal ..... *aenipennis*
Wings not at all greenish; abdomen moderately broad 29

29. The broad plate with scattered fairly long hairs; wings yellowish to rufous, head very broad, behind eyes ..... *frivaldszkyi*
The broad plate with short, dense mass of black hairs confined to a triangular area, the apex of triangle at base 30

30. Wings rather fusco-hyaline; base, especially of hind wings yellowish; sides of the hairy triangle about straight ..... *persephone*?
Wings yellowish to rufous; sides of hairy triangle a little convex ... *defecta*

31. Subgenital plate very long, slender and curved down toward tip, its surface densely clothed with long hair, somewhat recurved ..... *Dinopepsis*, 32

Subgenital plate short, rather nodose, and clothed on the nodose part with short black hair 33

32. Wings black, fore wings narrowly whitish at tips ..... *grossa*
Fore wings brown or yellowish brown, hind wings much paler yellowish ..... *theresiae*

33. Wings black ..... *hymenaea*
Wings mostly yellowish ..... *cofanes*

Subfamily PSEUDAGENINAE

Historically Agenia (now Pseudagenia) and Priocnemis were related genera; Priocnemis for those species with teeth and stout spines on the hind tibiae, and Agenia without such spines or teeth. As species in each genus increased in numbers they also increased in variety. Some had very small or rudimentary teeth, some had more or less stiff bristles or even stout spines, but no teeth. Then some authors used the bristles on mentum (beard) to separate Pseudagenia from related forms. Since the teeth on hind tibiae and the beard are structures largely confined to the females, the result was that males of Priocnemis were described under Pseudagenia, and species related to Pseudagenia but with stout spines or minute teeth were placed in Priocnemis or Salius.

Gradually subfamilies were proposed in the Psammocharidae, and Priocnemis placed in one subfamily and Pseudagenia in another. Now with a host of species breaking through their ancient limits, a new character is needed for separating the two groups. So I am using the nature of the attachment of the abdomen to the propodeum. In typical Pseudagenia the basal segment of abdomen narrows in front to form a petiole and then enlarges a little as it joins the propodeum; in the middle, therefore, this petiole is concave on each side, hour-glass shape. In typical Priocnemis there is no such petiole, the basal segment is narrowed, sometimes suddenly, sometimes very gradually but with straight or convex sides, not enlarged before attachment to the propodeum. (cf. Figs. 44, 45, 48)

By this character the males and females of a species will not be placed in separate subfamilies. Thus both Pseudageninae and Cryptochilinae will have species with tibial armature in various stages of development, with the last joint of hind tarsi with or without teeth, and each with large and small, stout and slender species. All of the Pseudageninae have toothed claws, in Cryptochilinae several genera with cleft claws.

Table of genera

1. Clypeus very large, about as long as width of lower margin, the lower margin hardly more than one-half of upper margin, the sides are oblique and nearly as long as lower margin..... 2
   Clypeus much shorter, at least twice as broad as long; if sides separate from lower margin they are shorter..... 3

2. Last joint of mid and hind tarsi with spines on each side; mesosternum with a hump laterally, hind tibiae with row of small spines.....*Phanochilus*
   Last joint of tarsi without spines, front tibiae with a stout spine at outer tip.....*Priocnemella*

3. Median vein reaches the outer margin of wing; under the head is a group of widely spreading bristles (beard); legs short; front femora stout.....*Dipogon*
   Median vein does not reach outer margin..... 4

4. With an elliptical, smooth, shining pygidium on last dorsal segment; long, rather stout bristles from base of mentum (beard); propodeum hairy above.....*Pseudagenia*
   No such separated shining pygidium..... 5

5. A distinct group of long, curving or straight bristles on mentum, or labium; lower edge of clypeus raised somewhat above mouth; anal vein in hind wings ends at or beyond forking of cubitus..... 6
   Only scattered, short, inconspicuous hairs under head..... 7

6. On hind tibiae, at least toward base, are distinct, tho often small teeth.....*Alasagenia*
   On hind tibiae, no teeth, but only short spines or bristles.....*Lissagenia*

7. Hind basitarsus flattened and slightly curved; head very broad, clypeus over four times as broad as long; hind tibiae not plainly spined.....*Eragenia*
   Hind basitarsus not flattened and broadened; head and clypeus not so broad..... 8

8. Hind tibiae above with some distinct, tho often small, teeth, at least on basal part; propodeum hairy on posterior slope..*Priophanes*
   No distinct teeth above on hind tibiae, altho often with short spines..... 9

9. No hair above on propodeum; stigma projecting into marginal cell only a little on upper edge, tip obliquely truncate.....*Ageniella*
   A few hairs at least on posterior slope of propodeum; hind tibiae often with spines above; stigma more slender, tip projecting further into marginal cell and lower edge convex...*Ameragenia*

Pseudagenia Kohl

Synopsis of Females

0. Basal segment of abdomen yellowish; legs yellowish except tips of tarsi ..... *mendica*
   Basal segment of abdomen black, or bluish 1

1. Head, thorax, or propodeum bluish or greenish; wings not banded 2
   Neither head, thorax, nor propodeum noticeably bluish or greenish 10

2. Clypeus black, with a very small, pale round spot on each side; lower face with narrow yellowish streak in each orbit; wings yellowish; antennae rather thick ..... *auricoma*
   Clypeus yellowish, with a black spot in middle, the yellowish extending up each side 3

3. Legs with the femora reddish or yellowish, often patches of pale hairs on hind corners of propodeum 4
   Legs wholly black; propodeum usually striate all over 7

4. Propodeum minutely striate across middle base, coarsely punctate behind; a distinct median furrow; mid tibia pale, basal segment of abdomen plainly hairy above ..... *tarsata*
   Propodeum at middle base not striate across; median furrow not so distinct or none 5

5. Appressed pubescence of head and thorax rather dull yellowish, not snow white; head and thorax usually greenish; all femora and tibiae yellowish ..... *viridis*
   Appressed pubescence is snow white 6

6. Front femora largely black and tibiae partly so, abdomen bluish to violet; mid and hind femora black at one end; both recurrent veins end before middle of cell ..... *wheeleri*
   Front femora and tibiae wholly yellowish; propodeum punctate behind ..... *femorata*

7. Very hairy, long white hair on clypeus and front, on propodeum behind and on first segment of abdomen above and below; wings rather smoky, not black; abdomen black, thorax broad ..... *robusta*
   Much less hairy; clypeus and front not noticeably hairy; basal segment of abdomen with extremely minute if any hair; wings often evenly blackish 8

8. Wings hyaline, no dark bands, stigma black, basal joint of antennae yellowish above and below; face and clypeus with short, golden appressed hair ..... *paniquita*
   Not so 9

9. Head and thorax but little bluish; abdomen shining black; inner spur of hind tibia one-half of basitarsus ..... *peruana*
Head, thorax and abdomen strongly bluish, iridescent on abdomen; inner spur of hind tibia not one-half of basitarsus . *caeruleosoma*

10. Face and thorax with golden hair and pubescence; wings yellowish 11
Face and thorax without golden pubescence 12

11. Clypeus and triangular spot on lower orbits yellowish; also hind border of pronotum ..... *princeps*
No yellowish on clypeus, face, nor pronotum, all black ..... *auricoma*

12. Femora and rest of legs black, wings black, head and thorax faintly bluish ..... *peruana*
Some femora yellowish or rufous 13

13. Only the hind femora rufous; patches of white pubescence each side at end of propodeum; clypeus and lower face with long white hair ..... *comparata*
Other femora also rufous 14

14. Antennae pale yellowish, at least on basal part; all femora and tibiae yellowish, trochanters black ..... *lorenzana*
Antennae nearly black 15

15. Mid and hind tibiae black; body with fine white pubescence, clypeus nearly triangular 18
Mid and hind tibiae yellowish or rufous 16

16. Trochanters yellowish; clypeus and lower face with white appressed pubescence ..... *militaris*
Trochanters black 17

17. Basal joint of antennae black below as above; propodeum fully as broad at base as long; abdomen broad in middle; antennae deep black; tegulae dark ..... *rufipes*
Basal joint of antennae pale yellowish below; face with white pubescence below and on clypeus; antennae brown to yellowish 19

18. Front femora yellowish as others; wings somewhat yellowish . . *magdalena*
Front femora black, others rufous; wings hyaline ..... *smithi*

19. Tegulae pale yellowish; propodeum strongly convex, high at base, near turn it is striate or slightly ridged transversely ..... *associata*
Tegulae dark; propodeum low, only slightly convex, not striate . . *amalotis*

Males

1. Face or clypeus on sides with a white or yellowish spot, not simply pubescence 2
Face and clypeus wholy dark, or the extreme lower margin of clypeus paler 4

3. Body blue; all femora and front tibiae rufous, mid and hind tibiae and tarsi dark ..... *femorata*
   Body black; femora, front and mid tibiae and most of hind tibiae rufous ..... *rufipes*
4. Body plainly bluish, and very hairy; all femora and tibiae yellowish, clypeus truncate below ..... *tarsata*
   Body black, much less hairy 5
5. Clypeus very short, with a median lobe, and sides sloping outward from base of lobe, tibiae dark, no pale spot near tip of abdomen ..... *smithi*
   Clypeus without median lobe, truncate below; tibiae partly yellowish, pale spot at tip of abdomen above ..... *magdalena*

Pseudagenia auricoma spec. nov.

Black, with golden pubescence on many parts, most brilliant on clypeus, lower face, shoulders, lower sides of pronotum, coxae, and broadly on sides of propodeum; rather dull on abdomen; antennae dull rufous to almost entirely black; legs, beyond trochanters, yellowish, but last two joints of tarsi black, in older specimens front femora black at base and hind femora almost black on under side, spurs pale yellowish. Fore wings flavescent, hind wings less so, stigma yellowish, veins mostly brown or yellowish brown.

Clypeus strongly convex below, almost coming to a point in middle, not twice as broad as long, lower half with fine pale hairs; face higher than broad, little narrowed on vertex, second plus third antennal joints not equal to vertex-width, lateral ocelli nearer each other than to eyes, few hairs on front and vertex; pronotum broadly arcuate behind, shoulders with short hair; propodeum fully as broad as long, a median groove, deeply pitted on posterior slope and sides, hair fairly long above; first segment of abdomen with short hair on basal part above and below, last segment with short hair above, longer below and on sides, and some on each ventral segment. Legs slender, the inner spur of hind tibia fully one-half of basitarsus.

In fore wing the marginal cell is long, little more than half its length from wing-tip, barely broader than second submarginal cell, latter nearly twice as long below as broad, one-fourth shorter above, receiving first recurrent vein near middle, third submarginal cell fully one-third longer than second below, a little longer above than second, outer side scarcely curved, receiving the second recurrent (curved near upper end) before middle; basal vein sloping but little, lower section scarcely curved, ends well before forking of cubitus,

outer cross-vein oblique and on radial sector nearer tip than base.

Length of fore wing, ♀, 10 mm.

From Nova Teutonia, Santa Catharina, Brazil, 4 October, 22 December, 23 January (Plaumann).

The male is a deeper black than female, with golden pubescence on lower face where there is a yellowish streak each side, and on each side of clypeus a small round, yellow spot, and on propodeum white hair each side, and a narrow line of white at tips of most segments of abdomen. Wings yellowish as in female, but tip a little brown; antennae deep-black, a yellow mark on under side of basal joint; legs like female, but three or four joints of tarsi black.

Clypeus fully two and one-half times as broad as long, truncate below; antennae thickened, from third to tenth each joint hardly three times as long as broad; venation much like female, but second recurrent bent near lower end; abdomen more slender, and without hairs.

Length of fore wing 9 mm.

From same locality, 21 October (Plaumann).

Type M. C. Z. no. 26619.

Pseudagenia femorata Fabricius (Pompilus) (Fig. 41)

From Kartabo, 13 May; Bartica 29 January, 1 February;Demerara River, 12, 19, 22, 26 March, all British Guiana. St. Augustine, Trinidad, 23 March, 6 May (N. A. Weber); Rio Frio, Magdalena, 18 July (G. Salt); Santarem, Brazil (H. H. Smith) and Urucum, Corumba, Brazil, 23 to 29 December (Cornell Univ. Exped.).

The male is metallic blue or green as in female, the clypeus broadly yellowish each side, and the pale extending up each orbit to above middle of face; antennae mostly yellowish beneath; mid and hind tibiae somewhat brown the tarsi nearly black; the abdomen has a white spot above at tip; the clypeus is fully two and one-half times as broad as long, lower margin truncate.

Pseudagenia viridis Smith (Agenia)

From Muzo, Dept. Boyaca, Colombia, 900 m. June (Bequaert).

This may not be the true *viridis*, which was described from Sao Paulo. It differs in having the legs yellowish except that the last four joints of mid and hind tarsi are dark. *Auplopus* Spinola 1841 may have been based on this species.

PSEUDAGENIA RUFIPES spec. nov.

Body black, antennae black, palpi brown, legs rufous, coxae and trochanters black; last two or three tarsal joints black; a spot of whitish pubescence at each hind corner of propodeum, coxae beneath sericeous, abdomen slightly sericeous, but basal segment shining. Wings slightly yellowish, veins brown, stigma dark brown, hind wings hyaline, veins brown.

Clypeus about two and one-half times as broad as long, rounded below, some black hairs on surface; face about as broad in middle as high, little narrowed above, front with distinct median line and some fine short hairs, few longer on vertex, vertex-width little more than length of second and third antennal joints together; lateral ocelli very much closer to each other than to eyes; pronotum broadly arcuate behind, slightly hairy above; propodeum about as broad at base as long, from side nearly evenly curved, above faintly closely striate, and with moderately long hairs and some snow-white pubescence on each hind corner; abdomen above shining, basal segment slightly hairy, last segment with fine white hairs above and below, few hairs on ventral segments. Legs rather short, hind femora not reaching to tip of abdomen, inner spur of hind tibia more than one-half basitarsus.

In fore wing the marginal cell is more than half its length from wing-tip, fully as broad as second submarginal cell, latter almost twice as long below as broad, only a little shorter above, receiving the first recurrent near middle; third submarginal cell a little longer below but about same length as second above, outer side sloping and sinuous, receiving the second recurrent vein (nearly evenly curved) plainly before middle; basal vein ends before transverse, lower section scarcely curved; in hind wings the anal vein ends a little before forking of cubitus, outer cross-vein oblique and nearer tip of radial sector than to base.

Length of fore wing 8 mm.

Female from Nova Teutonia, St. Catharina, Brazil, 15 November (Plaumann).

The male is black, clypeus white, with a median black stripe, and each side of antennae a nearly triangular white spot, on orbits reaching up almost two-fifths way to the vertex; antennae only a little thicker than in the female, the second plus third joints only about two-thirds of vertex width; clypeus only a little more than twice as broad as long, truncate below, the sides sloping a little, but straight; the striae on propodeum scarcely noticeable, outer corners and hind

coxae with silvery pubescence; abdomen more slender than in female; legs much as in female, hind femora reach tip of abdomen, inner spur of hind tibia nearly two-thirds of basitarsus; structure of body and venation much as in female.

Length of fore wing 7 mm.

From Nova Teutonia, St. Catharina, Brazil, 1 November (Plaumann). Type M. C. Z. no. 26618.

Pseudagenia comparata Smith (Agenia) (Fig. 50)

From Tumatumari, Potaro River, 28 June; Kamakusa, (H. Lang); Kartabo, 10 March; July-August (Wheeler), Kaieteur, 31 July, all British Guiana; Santarem, Brazil (H. H. Smith).

Pseudagenia smithi Dalla Torre (Fig. 40)

From Kartabo, British Guiana 7 May (W. Beebe); Rio Frio, Colombia, 20 April (G. Salt); and Restrepo, Dept. Meta, 800 m., August (J. Bequaert). *Pseudagenia semisuavis* Cameron from Demerara, British Guiana is probably a synonym of this species. *Pseudagenia smithi* (*Agenia femorata* Sm.) was based on a male; a male from Kartabo agrees closely with the details of coloring in the description. There is no yellowish in the wings. The clypeus is very short, the lower margin has a rounded median lobe projecting much below sides, the sides slope outward from base of lobe; there is no pale spot on sixth nor seventh segment; basal segment hairy above and below. The females which, I believe, go with this male are no larger than male, black (no bluish); the mid and hind femora rufous, with the extreme tip dark, the front legs are wholly black; the wings hyaline with dark venation and stigma; the head and thorax have the white hair not so dense as in the male; propodeum punctate, with fairly long white hair, also fine hair on basal segment of abdomen above and below as in male, tip with very short hair. The clypeus is triangular much as in *femorata*, but median point more blunt and rounded, and each side of tip the margin is very faintly a little concave; lateral ocelli plainly nearer each other than to eyes; second plus third antennal joints scarcely, if any, longer than vertex width; inner spur of hind tibia one-half of basitarsus; venation as in *femorata*, *comparata*. Turner (1915) considered it a synonym of *comparata*; I have not seen the male of *comparata*.

Pseudagenia peruana spec. nov.

Black, head and thorax with some bluish, usually distinct, abdomen shining black, only a trace of bluish, antennae and legs black, hind femora sometimes bluish. Wings an even dark brown, veins and stigma black. Body with little hair, a few long ones on vertex, those on propodeum rather short, not many at tip of abdomen, and those on venter also short.

Clypeus almost twice as broad as long, subtriangular, almost coming to a point in middle below; face much higher than broad, little narrower on vertex than on base, second plus third antennal joints equal vertex-width; lateral ocelli almost twice as near each other as to eyes; pronotum hardly angulate behind; propodeum not quite as broad as long, from side about evenly curved, above plainly striate, more coarsely than in *P. wheeleri* and more evenly than in *P. robusta*, the punctures at base of hairs are very minute; basal segment of abdomen with moderately long petiole, the terminal segment somewhat compressed, the pygidium rather broad and highly polished; legs long, the hind femora reach fully to tip of abdomen; hind tibiae with a row of small spine-pits, but no evident spines, inner spur not one-half of basitarsus.

In fore wings the marginal cell is more than half its length from wing-tip, and nearly one and one-half times as broad as second submarginal cell, latter more than twice as long below as broad, narrowed one-third above, receiving the first recurrent vein at middle; third submarginal cell one-fourth longer below than second, narrowed one-third above, outer side strongly oblique, but not bent, receiving the second recurrent vein (scarcely curved) at basal third; basal vein plainly before transverse vein, but little sloping; in hind wing the anal vein ends a little before forking of cubitus; outer cross-vein nearer to tip of radial sector than to base.

Length of fore wing 9.5 mm.

Type (female) from Matucana, Peru, 26 May (Cornell) paratype from St. Eulalia, 1500 m., Peru, 1 May (Weyrauch) in M. C. Z. no. 26614.

Pseudagenia caeruleosoma spec. nov.

Head, thorax, propodeum, coxae, and abdomen a bright deep blue, the abdomen with a purple iridescence; rest of legs black, as also the antennae; wings an even dark brown (as in *peruana*). Clypeus and lower face with a silvery pubescence. Structure very similar to

peruana; the clypeus is fully twice as broad as long, not as long as in *peruana*; the lower edge more rounded so clypeus not so triangular; face, vertex, ocelli, and antennae as in *peruana*; thorax and abdomen very similar to that species; the propodeum more coarsely and less evenly striate than in that species, punctures not as prominent as in *robusta*; the hind femora reach tip of abdomen, inner spur of hind tibia not one-half of basitarsus.

Venation similar to *peruana*, but the third submarginal cell not so much larger than second as in that species, and second recurrent ends not far before middle, basal vein and venation of hind wing as in *peruana*, the veins are not as heavy as in *peruana*.

Length of fore wing 8 mm.

From Lima, Peru, 6 June, 20 August (Parish coll.). Type at Cornell Univ., paratype at M. C. Z. no. 26615.

Pseudagenia princeps spec. nov.

This is, in general very similar to *auricoma*, having golden pubescence on parts of thorax and propodeum, but little on abdomen except first segment; the pleura is slightly bluish, particularly just below base of wings.

The clypeus is wholly yellow, also a long triangular spot on each lower side of face extending up about one-half way to vertex; antennae brown to yellowish brown, but pale on basal joint, especially below; the pronotum has a yellow border behind, and also on lower sides, meso and metapleura somewhat iridescent bluish; the legs are yellowish, last two or three tarsal joints dark; the yellow has invaded the coxae so that the front ones are wholly yellow in front and partly behind, the others have some black above, the trochanters and base of femora are black; wings yellowish as in *auricoma*, veins pale yellowish, stigma yellow; venation scarcely differs from *auricoma* except that the second recurrent is only slightly curved and the second submarginal cell longer. Structure much like *auricoma*, but the second plus third antennal joints fully equal vertex-width, propodeum hardly as much pitted behind, and the basal segment of abdomen less hairy; inner spur of hind tibia fully one-half of basitarsus.

Length of fore wings 9.5 to 10 mm.

Females from Nova Teutonia, Santa Catharina, Brazil, 14 February and 23 December (Plaumann). Type M. C. Z. no. 26620.

Pseudagenia tarsata Smith (Agenia) (Figs. 47, 49)

From Kartabo, British Guiana, 9 June, 17 August; Carovellas, Brazil, January (Fairchild coll.)

The male has head and thorax mostly blue; lower face and clypeus silvery; pronotum, coxae, pleura, and tip of propodeum with fine white pubescence; abdomen black, with slight bluish iridescence, and minute white pubescence most noticeable on sides; all femora, front tibiae and tarsi yellowish, except last tarsal joint; mid tibae also pale, the tarsi and hind tibiae yellowish brown, hind tarsi brown. Face and clypeus with much short, erect white hair, prothorax, pleura, and apical half of propodeum with longer white hair; basal segment of abdomen above with erect hair, and more than usual on the venter; usually a little below hind femora. Clypeus truncate below.

Pseudagenia amalotis spec. nov.

Black, abdomen shining; antennae yellow-brown to dark brown; legs yellowish, coxae, trochanter, and last two or three joints of tarsi black. Wings plainly a little yellowish, veins pale brown, stigma black. Head with a fine white pubescence, silvery on clypeus and lower face, a spot each side at tip of propodeum and less distinctly on pleura, coxae, and sides of abdomen.

Clypeus about two and one-half times as broad as long, lower edge a little convex, surface hairy, some short hairs on front, face higher than broad, a little narrowed above, second plus third antennal joints not nearly equal to vertex width, lateral ocelli one and one-half times as far from eyes as from each other; pronotum broadly arcuate behind; from side the propodeum is only slightly but evenly curved, above hairy on the posterior slope, rather finely punctate; basal segment of abdomen not hairy, last segment with very fine short hairs above, few and fine short hairs on venter. Legs moderately slender, hind femora nearly reach tip of abdomen, hind tibia with the barest trace of a few spine-pits above, inner spur fully half of basitarsus.

In fore wings the marginal cell more than half its length from tip of wing, in breadth nearly one and one-half times the second submarginal cell, latter rather small, more than twice as long below as broad, narrowed one-third above, receiving the first recurrent vein close to middle; third submarginal cell about one and one-third times as long below as second, but only a little longer than second above, tip broad, end-vein sloping, but scarcely curved, receiving the second

recurrent (faintly curved) at basal third; basal vein ends plainly before transverse, moderately sloping and a little curved; in hind wings the anal vein ends much before forking of cubitus, and outer cross-vein is about one-half way out on the radial sector.

Length of fore wing 8 mm.

Female from Nova Teutonia, Santa Catharina, Brazil, 15, 17 June (Plaumann). Type M. C. Z. no. 26617.

Pseudagenia militaris Lynch-Arribalzaga (Agenia)

Body black, abdomen shining, white pubescence on clypeus, lower face, and orbits, and a little at each hind corner of propodeum; antennae black; legs rufous, coxae and tips of tarsi black; wings slightly yellowish hyaline; head moderately hairy, pleura with short hair, propodeum with longer hairs above, tip of abdomen and venter hairy.

Body rather broad, head broader than pronotum; clypeus about two and one-half times as broad as long, rounded below, hardly triangular, face higher than broad, slightly narrowed on vertex, second plus third antennal joints almost equal to vertex-width; lateral ocelli almost twice as far from eyes as from each other; pronotum angulate behind; propodeum at base somewhat broader than long, slightly narrowed behind, from side evenly curved, above hairy and finely and closely striate, basal abdominal segment slightly hairy above and below. Legs short, hind femora not reaching end of abdomen; hind tibia smooth, mid tibiae with some short bristles above, inner spur of hind tibia almost one-half of basitarsus.

Fore wing with marginal cell two-thirds its length from wing-tip, much broader than second submarginal cell, latter fully two and one-half times longer below than broad, about one-third shorter above, base very oblique, receiving the first recurrent beyond middle, third submarginal cell about one-fourth longer below than second, scarcely longer than second above, outer side very oblique, little curved, receiving the second recurrent vein near end of basal third; basal vein ends a little before transverse, but little oblique and scarcely curved; in hind wings anal vein ends much before forking of cubitus, outer cross-vein nearer to tip than to base of radial sector. Length of fore wings 10 mm.

One female from Tucuman, Argentine (C. S. Reed) Cornell Univ.

This agrees fairly well with the description by Lynch-Arribalzaga, in the Naturalista Argentina, vol. I, 324, 1878. This was wholly colorational, but I doubt if another Argentine species will have the same combination.

Pseudagenia mendica spec. nov.

♀ Body dull black, palpi pale yellowish, face, pronotum and mesonotum greenish, basal segment of abdomen pale yellow, petiole black, hind margin of other segments very narrowly pale, antennae dark brown, basal joint mostly pale yellowish; legs (including mid and hind coxae) pale yellowish, last few joints of tarsi brown. Wings faintly and evenly fumose, most distinct on fore wings, stigma and veins pale brown. Lower face and clypeus with dense white pubescence, also on much of pronotum, pleura, and more densely on propodeum at each hind corner.

Clypeus coming to a distinct, though short, point at middle of lower margin, length less than one-half of the width; face but little narrowed above, frontal groove indistinct; ocelli in a rather elongate triangle, hind ocelli plainly nearer each other than to eyes; antennae long, the third joint almost equal vertex-width.

Pronotum behind slightly and broadly arcuate. Propodeum rather long and (from side) rather low, only very lightly curved above, hair very fine and white, no distinct median line; abdomen slender, petiole long, some long hairs near tip of abdomen, venter with more. Legs very slender, mid tibiae on upper outer half with some distinct, but short bristles; hind tibiae with a row of very minute, short bristles, inner spur more than one-half of basitarsus.

In fore wings venation much as in *P. femorata*; but first recurrent ends much before middle, and second only about one-fourth way out; the marginal cell a little more acute at tip; in hind wings the anal vein ends much before fork of cubitus.

Length of fore wings 7 mm.

One female from Tena, Ecuador, 5 March (F. X. Williams).

Type M. C. Z. no. 26756.

Pseudagenia associata spec. nov.

♀ Body black, a faint trace of blue on the thorax, abdomen shining above; antennae brown, basal joint pale below; legs pale yellowish, trochanters mostly dark, last three joints of tarsi brown. Face and clypeus densely white pubescent, also on pronotum on sides and behind; tegulae pale yellowish; head white-haired, pronotum also, but shorter, pleura hairy, propodeum with long white hairs, tip of abdomen and venter also with white hairs. Wings nearly hyaline, faintly sordid, veins and stigma brown.

Clypeus hardly twice as broad as long in middle, below nearly

evenly rounded, face narrowed toward vertex, latter about equal length of third antennal joint, frontal groove very faint, hardly noticeable, hind ocelli nearer each other than to eyes, pronotum broadly arcuate behind; propodeum very steeply sloping on posterior half, much more so than in *P. amalotis*, rather densely punctate behind, median groove hardly distinct, the surface of basal part is plainly though finely striate transversely; abdomen fusiform, petiole moderately long, pygidium punctate on apical half.

Venation much as in *P. femorata*, third cell a trifle shorter, and second recurrent vein more curved and ends nearer to base of third cell. Legs rather more slender than in *P. amalotis*, mid tibiae above with numerous short, but distinct bristles; on hind tibiae a row of similar bristles; inner spur of hind tibiae about one-half of hind basitarsus.

Length of fore wing 8.5 mm.

Two females from Naranjapata, Ecuador, December, 1850 ft. (F. X. Williams) Type M. C. Z. No. 26757; also from Cali District, Cauca Valley, Colombia, 4 February (Amer. Mus. Nat. Hist.). Closely similar to *P. amalotis* from Santa Catharina, Brazil, but in that species the tegulae are dark, venation paler, propodeum not so steep behind, and hair shorter; the pygidium of *amalotis* is not punctate; and the mid and hind tibiae have finer and scarcely distinct bristles.

Pseudagenia paniquita spec. nov.

♀ Body black, legs black, front coxae and femora, pleura and propodeum bluish; palpi dark, basal joint of antennae yellow above and below, rest brownish, but yellowish on underside of basal half, last four joints dark brown; wings hyaline, veins and stigma black. Clypeus and face up to ocelli with scattered appressed golden scale-like hairs front with erect short hairs; mesonotum and scutellum with whitish appressed fairly dense scale-like hairs, apical part of propodeum with snow-white pubescence and erect, long white hairs. Clypeus a little more than twice as broad as long, broadly rounded below; face broad, frontal line indistinct, hind ocelli nearer each other than to eyes. Pronotum short, arcuate behind, shoulders prominent, almost forming a ridge laterally. Propodeum with distinct median groove, coarsely punctate, and indistinctly finely striate. Abdomen broadest beyond middle of second segment and here as broad as propodeum, basal segment polished; legs slender, spurs black, hind

tibia with a narrow groove above, no distinct bristles, inner spur not one-half of basitarsus.

Venation much as in *femorata*, but marginal cell not as long, fully two-thirds its length from wing-tip second and third abscissae subequal, fourth shorter; third submarginal cell not as long as in *femorata*, outer side sloping, upper part concave outwardly, lower part convex, first recurrent ends beyond middle and second recurrent (little curved) ends near basal third; basal vein ends a little before transverse; in hind wings the anal vein ends plainly before forking of cubitus.

Length of fore wings 10 mm.

One from between Queremal and Buenaventura, Colombia, 11 July, 3500 to 4000 ft. (H. F. Schwarz). Type in Amer. Mus. Nat. Hist.

Dipogon Fox

This genus is readily recognized by the thickened front femora, the median vein reaching the margin of wing, and the widely spread, curving bristles of the beard, in some cases spreading beyond the side of head.

The four forms separate as follows:

1. Band over basal vein much broader than the stigmal band; second submarginal cell extends basally ..... *alastor*
   Band over basal vein narrower than the stigmal band 2
2. Second submarginal cell extended basally, very much longer than the third cell; stigmal band extends basally into first submarginal and first discoidal cell ..... *populator*
   Second submarginal cell of normal size; stigmal band not extended basally 3
3. Front femora rufous as the tibiae; third joint of antennae fully three times as long as the second ..... *neotropica*
   Front femora dark brown; third antennal joint not quite twice as long as the second ..... *ariel*

Dipogon ariel spec. nov. (Fig. 38)

♀ Body black, propodeum and abdomen above shining, lower face and clypeus rather strongly sericeous, above less distinctly, hind margin of propodeum with a narrow band of whitish pubescence; antennae mostly dull rufous, but basal segment brown; femora black, front tibiae and tarsi pale to yellowish, mid tibiae dark, with tips pale, tarsi pale, hind tibiae wholly dark, tarsi pale. Wings hyaline,

veins and stigma brown, fore wings with a narrow brown band over basal and transverse veins, a brown spot occupying the basal two-thirds of marginal cell, most of second submarginal, most of upper part of third submarginal, and some in upper part of third discoidal cell.

Clypeus with lower margin convex; face widening above, narrowed a little before vertex, but vertex broader than clypeal base; hind ocelli a little nearer to each other than to eyes; pronotum very short as usual, arcuate behind; propodeum evenly rounded, from side evenly convex, finely hairy on sides; abdomen fusiform, slender, not as broad as mesonotum.

Legs short as usual, front femora somewhat thickened, hind tibiae without spines or bristles, inner spur little more than one-third of basitarsus.

In fore wings the marginal cell is nearly its length from wing-tip, outer side slightly convex, much broader than second submarginal cell, latter nearly twice as long below as broad, receiving the first recurrent vein before middle; third submarginal cell little longer below than second, much wider toward tip, the outer side strongly oblique and curved, receiving the second recurrent vein (curved, but nearly vertical) before end of basal third; basal vein with lower section bulging, ends well before transverse; in hind wings the anal vein ends before the forking of cubitus. The hair-basket under head is of white bristles, the lateral ones curving far outward.

Length of fore wings 4 mm.

One female from Tena, Ecuador, 24 March (F. X. Williams). Type M. C. Z. no. 26771.

Dipogon alastor spec. nov. (Fig. 42)

♀ Body black, above shining, face with scattered fine, whitish pubescence, top of propodeum and mesonotum rather coarsely granulate; front coxae pale yellowish, others partly yellowish, femora mostly yellowish except dark above, tibiae and tarsi more brown, except fourth and fifth tarsal joints pale; antennae yellowish on basal part (including first joint) toward tip brown, antennae longer than usual, the second plus third joints nearly equal vertex-width. Wings hyaline, veins fine, not dark except in the dark band, fore wings with two bands; a very broad, almost black band over basal and transverse veins, of about equal width throughout, covering first median cell and before transverse vein, a rather pale brown

behind stigma, not in marginal cell, but in most of second and third submarginals and most of third discoidal cell.

Clypeus convex below; face not widened above antennae, but narrowed toward vertex, still vertex broader than clypeal base; hind ocelli nearer each other than to eyes; pronotum very short in front which is nearly vertical, top of moderate length, arcuate behind; propodeum rounded as usual; abdomen as broad as mesonotum; legs of moderate length; front femora only slightly thickened, hind tibiae without spines or bristles, inner spur nearly one-third of basitarsus.

In fore wings the marginal cell is very large, not its length from wing-tip, outer end straight, second submarginal cell narrowed at tip, about twice as long below as broad, receiving the first recurrent vein before end of basal third; third submarginal cell in shape much like that of *D. populator*, receiving the second recurrent vein (curved) before end of basal fourth; basal vein ending only a little before transverse; in hind wings the anal vein ends much before the forking of cubitus.

Length of fore wings 5 mm.

One female from Napo, Pano River, Ecuador, 8 April (F. X. Williams.) Type M. C. Z. no. 26772.

Dipogon neotropica Kohl (Agenia) (Fig. 39)

This was said to be ten millimeters long, my specimen is but eight, but otherwise agrees. The markings on fore wings are very similar to those on *D. ariel*, but both bands a little broader; the third submarginal cell is longer at top, the outer side slightly curved, and the second recurrent also curved and more oblique than in *D. ariel*. Described from Rio de Janeiro; specimens from Buena Vista, Paraguay, 11 February (D. Wees) and LaCumbre, Colombia, 23 May, (Parish coll.) Cornell Univ. Collection.

Dipogon populator Fox

This has a still longer second submarginal cell than in *D. alastor*, but the second band is much the broader and extends basally into first submarginal cell and into the first discoidal cell.

Described from Corumbá, Brazil.

Eragenia gen. nov.

Head broader than high, broader than thorax; clypeus about four times as broad as long; scutellum transversely ridged, metanotum on each side also ridged; propodeum nearly flat, basal two-thirds bare, a short posterior slope with long hairs; mid and hind tibiae above with some spine-pits but no distinct spines, all femora slightly thickened, the mid and hind basitarsi are strikingly compressed, fully two and one-half times as broad from side view as from above, second and third joints less compressed. Venation on the agenoid plan, marginal more triangular than usual, the third and fourth abscissae of radius forming a nearly straight line; no distinct beard, no smooth pygidium, mesosternum not greatly swollen laterally. In the male only the hind basitarsus swollen. The genotype is

Eragenia infelix spec. nov.

Body black, apical segment rufous, a small yellowish spot on middle of hind margin of second, third and fifth segments; legs dark brown to black, antennae rufous or brownish rufous, last two or three joints nearly black; wings hyaline, a broad brown band over basal vein, a large spot over second submarginal cell extending into base of marginal and upper part of third discoidal cells, tip scarcely darkened, veins brown, stigma yellowish brown, rather long and the part in the marginal cell rounded behind.

Clypeus fully four times as broad as long, lower edge rather evenly, slightly rounded, laterally it extends as a small sharp point under each eye, a few long bristles on lower part; face a little higher than broad, and narrowed a little on vertex, second plus third antennal joints not equal vertex-width, no distinct frontal groove, few hairs on front and vertex, lateral ocelli very much nearer each other than to eyes; pronotum very short above, arcuate behind, frontal slope scarcely curved, with short hair; propodeum nearly as broad in front as long, base not indented, no median groove, basal two-thirds nearly flat, posterior slope short and hairy; abdomen fusiform, petiole rather long, tip with dense rather short hairs above, many stiff, below fewer and shorter, very few on venter. Legs rather long, hind femora fully reaching tip of abdomen, mid and hind tibiae with a few spine-pits above, and a few very indistinct short bristles, hind tibia on lower inner side carinate, inner spur not one-half of basitarsus.

In fore wings the marginal cell nearly its length from wing-tip, triangular, the third and fourth abscissae of radial sector in a nearly

straight line, at greatest breadth nearly twice apical width of second submarginal cell, latter small, about one and one-half times as long below as broad, one-third narrowed above, receiving first recurrent vein plainly beyond middle; third submarginal cell about twice as long below and above as second, narrowed fully one-third above, outer vein little curved, receiving second recurrent vein (slightly curved below) before end of basal third; basal vein little curved, ending plainly before transverse, latter not oblique; in hind wings anal ends at forking of cubitus, outer cross-vein a little before middle of radial sector.

Length of fore wings ♀ 9 mm.

Male much smaller and more slender, black, with tip of last segment above white; antennae yellowish, last five or six joints dark, no pale spots on abdomen; wings with the same brown marks, venation about same but second recurrent is bent in middle; front tibiae and tarsi yellowish, and mid and hind spurs almost white; clypeus fully three times as broad as long, the flat part of propodeum longer, the slope less than one-fourth of length; first segment of abdomen very slender; tip of male genitalia in a slender sharp point.

Length of fore wings ♂ 7 mm.

Two males and one female from Iguazu Falls, Argentina, 20–22 Jan., (Cornell Univ. Exp.); paratype M.C.Z. no. 26636.

Ageniella Banks

Females

1. Head, thorax, and abdomen largely yellowish or rufous; fore wings with two dark bands ..... *rufula*
   At least abdomen black 2
2. Propodeum and scutellum rufous 3
   Propodeum and scutellum black 5
3. Entire thorax and propodeum rufous, two bands on fore wings; antennae with joints seven to ten pale ..... *micans*
   At least pronotum and part of mesonotum black 4
4. Fore wings nearly hyaline, with two dark bands, antennae with joints eight to ten pale ..... *amoena*
   Fore wings yellowish on basal part; no band on basal vein; tip of wings dark, antennae with joints seven to ten pale ..... *caloptera*
5. Antennae with joints five to seven dark above, before and beyond yellowish; third submarginal cell twice as long as second ..... *delila*

Antennae with joints seven to nine or ten yellowish, rest black; abdomen metallic blue ..... *bequaerti*
Antennae with joints one and two, eight, nine, and ten yellowish; joints three to seven and eleven and twelve black ..... *alternata*

AGENIELLA AMOENA spec. nov. (Fig. 43)

In general like *A. caloptera*. Black, with propodeum, scutelli, mesopleura reddish, sometimes the reddish invades the mesonotum; antennae black, joints eight to ten inclusive yellowish. Fore wings only slightly yellowish on basal half, tip dark, before it nearly hyaline, a narrow brown band over basal vein and a broader one over much of marginal cell and behind into the third discoidal cell; veins toward base mostly yellow; hind wings mostly hyaline, a trifle yellowish along costal margin and base, tip smoky, veins yellowish.

Clypeus pointed at sides as in the allied forms, face but little narrowed above, median line faint, second and third joint not nearly equal to vertex-width; ocelli in a small triangle, laterals much nearer each other than to eyes; pronotum broadly arcuate behind; basal part of propodeum nearly flat, apical part sloping, slight indication of a median groove; abdomen rather slender, petiole longer than in *caloptera*, venter with few hairs on each segment, tip with hairs above and on sides somewhat longer than in *caloptera*. Legs smooth and hind pair long as in allied forms; the tiny spines above on hind tibiae are extremely minute, inner spur nearly half of basitarsus.

Venation much as in *caloptera*; marginal cell broader than submarginals, but second submarginal cell is only a trifle longer than broad, and the third is more than twice as long as second below, the first recurrent ends beyond middle of cell, and the second recurrent plainly before middle; basal vein ends before transverse; in hind wings the anal vein ends barely before forking of cubitus, outer cross-vein about one-half way out on radial sector.

Length of fore wing 8.5 to 10 mm.

The male is similar, but basal half of antenna is rufous beneath; basal segment of abdomen more slender, tibial spurs white, inner spur of hind tibia more than one-half of basitarsus, hardly any hair at tip of abdomen.

Length of fore wing 6.5 mm.

Several specimens from Nova Teutonia, Santa Catharina, Brazil, 23, 25 January, 6, 15 May (Plaumann). Type M. C. Z. no. 26604.

I doubt that this is the *Salius* (*Priocnemis*) *adonis* Schrottky,

altho his description fits in some details; but putting it in *Priocnemis* would indicate there were teeth on hind tibiae; lateral ocelli also different, etc.

Agenia amabilis Taschenberg differs in having but one band on fore wings, and probably other points.

Ageniella alternata spec. nov.

♀ Body black; head, prothorax, and mesonotum rufous, antennae yellowish on first two joints, black on third to seventh; eighth, ninth, and tenth yellowish, eleventh and twelfth again black; propodeum with an elongate sericeous spot on each side near tip, slightly separated; femora dull red-brown, tibiae less brown, basitarsi more brown; rest of tarsi paler; wings hyaline, fore wings with two brown bands, one over basal vein is broad behind, other over most of marginal, second and third submarginal cells, stigma and veins brown.

Clypeus fully twice as broad as long, front margin from below appears slightly triconcave, there being a slight projecting angle at each end of the median part. Face narrow, only a little narrowed above, median line complete, hind ocelli much nearer to each other than to the eyes, vertex roundedly elevated above eyes; antennae slender, most joints subequal in length, the third but little longer than the fourth, third plus fourth scarcely longer than vertex-width. Pronotum scarcely angulate behind; but little hair on head and thorax; propodeum moderately long, from side but slightly curved, a distinct median line, becoming a groove behind; only a few weak hairs each side near tip.

Abdomen fusiform, basal segment moderately slender, pedicel fairly long; hairs above on fourth, fifth, and sixth segments, venter with scattered hairs; legs quite long and slender, pulvilli large and black, mid tibiae with short, stiff bristles above, a row on hind tibiae above.

In fore wings the marginal cell is acute at tip, about three-fourths its length from wing-tip; second submarginal cell once and a half as long below as broad, receiving the first recurrent at middle; third submarginal cell but little longer below than second, above shorter than second, outer side evenly curved, receiving the second recurrent (slightly curved in middle) before end of basal third, this cell about twice its length from wing-margin.

Length of fore wing 6 mm.

One female from Blairmont, British Guiana, October (F. X. Williams). Type M. C. Z. no. 26755.

AGENIELLA MICANS Fabr. (POMPILUS)

I consider that *Pseudagenia pulchricornis* Cameron is probably the same species; it was from Demerara. Others from Maracajú, Matto Grosso, Brazil, April, May (Fairchild); Tena, Ecuador, 16 March (F. X. Williams); Tumatumari, Potaro River, British Guiana.

AGENIELLA CALOPTERA Banks

Villa Nieve, San Lorenzo Mt., Colombia, 16, 22 December.

AGENIELLA BEQUAERTI Banks

Muzo, Dept. Boyaca, Colombia, 800 m., June.

AGENIELLA DELILA Banks

Kartabo, British Guiana.

AGENIELLA RUFULA Banks

Cincinnati, San Lorenzo Mt., Colombia, 29 December.

AMERAGENIA gen. nov.

Includes species of the general structure of Pseudagenia, without a pygidium in the female, and no real beard, at most a few short hairs, no teeth on hind tibiae, but often a row of stout bristles, and with some hair at least on the posterior part of propodeum; venation on the style of Pseudagenia. The clypeus often has a small lateral projection under the eyes, sometimes minute; face broad and but little narrowed above at vertex; antennae not very long. (cf. Fig. 29)

Nearly all have very little hair, even behind head and that on front coxae often sparse or short. Most of the species are smaller than those in the allied genera. Type *Ameragenia festina* spec. nov.

Four species have clypeus pale or partly so: *adele, pretiosa, notabilis, hilaris.* Five species have rufous above on thorax or abdomen: *notabilis, fabricii, partita, similaris, hilaris.* Stigma longer in marginal cell than width of stigma: *cleora, irene, dolorosa.*

Females

1. Thorax partly or wholly rufous..... 2
   Thorax and propodeum entirely black..... 4

2. Thorax and propodeum rufous; fore wings with dark spot on basal vein and band near stigma ..... *fabricii*
   Pronotum and mesonotum rufous, propodeum black; fore wings with two brown bands 3

3. Mid and hind legs dark; clypeus rounded below ..... *notabilis*
   Mid femora and tibiae mostly yellowish; clypeus broad, truncate below ..... *hilaris*

4. Abdomen rufous wholly or in part 5
   Abdomen wholly black 6

5. Abdomen wholly rufous, fore wings with two dark bands, one on basal vein narrow ..... *similaris*
   Abdomen rufous on most of first and second segments else black; small cloud in second submarginal cell and nearby ..... *partita*

6. Distinct dark band or spot on basal vein as well as dark on second submarginal cell 7
   Neither band nor spot on basal vein; sometimes dark on second submarginal cell 9

7. Legs yellowish, except tarsi; antennae and clypeus black; stigma long, the part in marginal cell rounded below ..... *irene*
   Legs dark; stigma shorter, the part in marginal cell obliquely truncate 8

8. Clypeus yellowish; lateral ocelli much nearer each other than to eyes ..... *pretiosa*
   Clypeus black; lateral ocelli scarcely nearer each other than to eyes; a band over basal vein ..... *volatilis*

9. Mid and hind femora and tibiae mostly yellowish or rufous, front femora usually partly dark; antennae yellowish on some joints toward base ..... *festina*
   All femora dark, or pale only on tip 10

10. Legs wholly black; fore wings with no dark in second submarginal cell or very faint; antennae black 11
    Legs with at least front tibiae yellowish 13

11. No band in fore wing; marginal cell nearly its length from wing-tip; second plus third antennal joints not equal vertex width; thorax black ..... *thione*
    A short stigmal band 12

12. Thorax with bluish iridescence; coxae and band across tip of propodeum silvery; second recurrent ends near middle; pronotum sloping in an even curve ..... *setaceicornis*
    Thorax without bluish iridescence; coxae and propodeum less silvery; second recurrent ends at basal third; pronotum short and steep in front; mesonotum strongly arched ..... *dolorosa*

13. No dark in second submarginal cell; antennae yellowish ..... *incrota*
Dark mark over second submarginal cell; antennae dark to yellowish brown, or yellowish near base 14

14. All femora mostly dark, but pale at tip; mid and hind tibiae pale at base and tip; lower margin of clypeus rufous ..... *adele*
Femora not pale at tip; clypeus wholly dark 15

15. Antennae brownish to yellowish; marginal cell about its length from wing-tip; stigma obliquely truncate at tip, projecting but slightly in marginal cell ..... *alcimeda*
Antennae black; marginal cell about two-thirds its length from wing-tip; stigma slightly rounded below in a longer extension into marginal cell ..... *cleora*

AMERAGENIA FESTINA spec. nov. (Fig. 46)

Body black; palpi pale, antennae black or almost so, third, fourth, and sometimes one or two more joints are yellowish, basal joint sometimes yellow below; legs with mid and hind femora and tibiae and basitarsi largely yellowish, the femora sometimes dark above or near base, front femora usually mostly dark above, usually yellowish below, front tibiae and tarsi yellowish; mid and hind tarsi beyond basitarsus are black; fore wings somewhat yellowish or vitreous, veins brown, stigma black; second submarginal cell wholly brown and this shade extends into third discoidal cell, tip of wing often faintly brownish; hind wings more hyaline, tip brownish.

Clypeus, lower face, coxae below, base of propodeum, and a large spot each side at tip sericeous, in some views almost silvery. Some hairs on clypeus, a few long ones on vertex, lower and posterior slope of propodeum, and white hair on tip of abdomen.

Clypeus nearly three times as broad as long, lightly rounded below; face much higher than broad, but little narrowed above; second plus third joints of antennae not nearly equal to vertex-width, frontal line scarcely visible; lateral ocelli a little nearer each other than to eyes; pronotum short above, a furrow in middle, hind margin almost angulate; propodeum short, slightly narrowed behind, no median groove, from side evenly and lightly curved; petiole of abdomen moderately long, last few segments conical, a few very short hairs on venter. Legs not very long, hind femora not quite reaching tip of abdomen; mid and hind tibiae with rows of distinct short black bristles above, inner spur of hind tibiae about one-half of basitarsus.

In fore wings the marginal cell is about two-thirds its length from wing-tip, nearly as broad as the third submarginal cell, stigma apically rounded below; second submarginal cell fully one and one-half times as long below as broad, narrowed one-fourth above, receiving the first recurrent vein at middle; third submarginal cell fully one-half longer below than second, narrowed one-third, outer vein little curved, receiving the second recurrent vein (scarcely curved) near basal third; basal vein ends plainly before transverse; in hind wings anal vein ends before forking of cubitus; outer cross-vein at about middle of radial sector.

Length of fore wing 6 to 6.5 mm.

Eleven females from Nova Teutonia, Santa Catharina, Brazil, 8 February, 4, 28 July, 4, 12, 15 August (Plaumann). Type M. C. Z. no. 26612.

Ameragenia pretiosa spec. nov.

Black, with some fine sericeous pubescence, not prominent except on lower face and across tip of the propodeum; clypeus and antennae yellowish, latter brown on joints four to six and nine to twelve inclusive; front tibiae and tarsi and inner surface of femora yellowish, mid and hind tarsi yellowish brown, black at tips of joints; wings hyaline, dark brown band over basal vein; the second submarginal vein and most of the discoidal behind are brown, veins pale brown, stigma black.

Head much broader than thorax; clypeus two and one-half times as broad as long, lower margin moderately convex; face higher than broad, narrowed above; lateral ocelli much closer to each other than to eyes; second plus third antennal joints shorter than vertex-width. Pronotum slightly angulate behind; propodeum about as broad as long, from side considerably flattened, hairs on posterior slope. Basal segment of abdomen with short petiole; apical segment almost without hairs above, but some below, and short ones on venter. Legs slender, hind femora not quite reaching the tip of abdomen, mid and hind tibiae above with some very short but distinct spines in pits, inner spur about one-half of basitarsus.

In fore wings the marginal cell more than one-half its length from wing-tip, one-half broader than second submarginal cell, latter a little longer than broad, rhomboidal, receiving the first recurrent at middle; third submarginal cell below one and one-half times as long as second, scarcely longer than second above, outer end much sloping, receiving the second recurrent (scarcely curved) before end of basal

third; basal vein ends a little before transverse, lower section bulging a little toward base; in hind wings anal ends much before forking of cubitus, the outer cross-vein about half way out on radial sector.

Length of fore wing 5 mm.

From Valle Chanchamayo, Peru, 1600 m. 1 April (Weyrauch). Type M. C. Z. no. 26611.

Ameragenia volatilis Smith (Agenia) (Fig. 37)

From Belem, Para, 19 September (J. Bequaert).

What I presume to be the male agrees with the female in appearance and bands and venation of wings. Body the same dull black on head and thorax; antennae yellowish, but joints six, seven, and eight are brown; the seventh segment of abdomen has a pale spot in middle; femora black, front tibiae and tarsi yellowish, others brown. The body is more slender than female. The clypeus and lower face, sides of pronotum, mesopleura, coxae below, line across base and spot each side near hind border of propodeum are silvery.

The lower margin of clypeus has two teeth near middle, and each outer corner is enlarged and prolonged into a much longer and larger tooth. The hairs on front as in female are very short and few; the pronotum is more shouldered each side than in female; the first segment of abdomen is not very long, but fairly slender; at tip about one-third of tip of second segment; the legs are little longer than in female, the femora not more slender; hind tibiae with groove along inner upper side and a few very minute spines along outer upper edge, inner spur one-half of basitarsus.

From Barro Alto, Minas, Brazil (Blaser).

Ameragenia thione spec. nov.

Deep black on body, antennae and legs; wings hyaline, veins and stigma dark brown, fore wing with tip beyond cells pale brown, and a faint darkening in second submarginal cell; clypeus and lower face, coxae, tip each side of propodeum sericeous, but none bright nor silvery; abdomen still more lightly sericeous.

Clypeus more than three times as broad as long, lower edge truncate and nearly parallel with the upper edge, few hairs on lower part; face almost as broad as high, vertex nearly as wide as base, frontal line faint, second plus third antennal joints not equal vertex-width, tho' the third joint is longer than usual, lateral ocelli much nearer each other than to eyes; pronotum arcuate behind; propodeum short,

scarcely narrowed behind, from side evenly curved, a few hairs on posterior slope; abdomen with rather long petiole, last segment with fine white hair, extremely short on venter; hind femora reach nearly to tip of abdomen, mid and hind tibiae with small spine-pits above, but scarcely distinct spines; inner spur of hind tibia not one-half of basitarsus.

In fore wings the marginal cell almost its length from wing-tip, much broader than the second submarginal cell; latter over twice as long below as broad, base strongly oblique, receiving the first recurrent vein near middle; third submarginal cell one and one-half times as long below as second, top about one-fourth shorter, outer vein slightly curved and oblique, receiving the second recurrent (very oblique) just before middle; basal vein ends much before transverse, lower section scarcely bowed toward base; in hind wings the anal vein ends plainly before forking of cubitus, outer cross-vein much nearer base than tip of radial sector.

Length of fore wing 4.5 mm.

One female from Nova Teutonia, Santa Catharina, Brazil, 23 January (Plaumann). Type M. C. Z. no. 26608.

Ameragenia setaceicornis Fox (Salius)

One female from Santa Cruz, Bolivia (Steinbach), compared with type which was described as a Salius (Priocnemis).

Ameragenia adele spec. nov.

Black, lower margin of clypeus rufous, palpi pale; antennae yellowish on basal six or seven joints, beyond brown; all femora black, pale at tip, front tibiae and tarsi pale rufous, mid tibiae pale at each end, dark in middle; tarsi pale, last joint black, hind tibiae dark brown, pale at base, tarsi brownish yellow. Wings hyaline, veins and stigma brown, no bands, but second submarginal cell is darkened and the shade extends into third discoidal cell. Hardly any hairs anywhere except on slope of propodeum and near tip of abdomen. Clypeus, lower face, coxae, lower mesopleura sericeous, also on propodeum broadly at base, and a spot each side behind, less distinctly on abdomen.

Clypeus nearly three times as broad as long, lower edge rounded, sides sloping, not extending laterally under eyes; face higher than broad, a little broader on vertex than on base, vertex slightly ele-

vated in middle, no distinct frontal line; second plus third antennal joints not nearly equal to vertex-width; lateral ocelli hardly as near eyes as to each other; pronotum nearly one-half length of mesonotum above, scarcely angulate behind; propodeum slightly narrowed behind, from side evenly convex. Abdomen with a short petiole, not very slender, tip with some white almost invisible hairs, few on venter.

Legs not very slender, but hind femora nearly reach tip of abdomen; mid and hind tibiae above with spine-pits and distinct tho' very short bristles; inner spur of hind tibiae two-fifths of basitarsus.

In fore wings the marginal cell is short, about its length from wing-tip, plainly broader than second submarginal cell, latter fully one and one-half times as long below as broad, each end incurved, receiving the first recurrent just before middle; third submarginal cell one-half longer than second both above and below, outer side curved and sloping, receiving the second recurrent vein (straight, oblique) at middle; basal vein ends a trifle before transverse; in hind wings anal vein ends much before forking of cubitus, outer cross-vein plainly before middle on radial sector.

Length of fore wings 4.5 mm.

One female from Santa Cruz, Bolivia (J. Steinbach). Type M. C. Z. no. 26613.

Another specimen from the same locality with the yellow more extensive on tips of femora, and third submarginal cell but little longer than second, probably belongs to the species.

Ameragenia alcimeda spec. nov.

Body, antennae, and legs black, but front tibiae and tarsi yellowish; wings hyaline, veins brown, a brown spot over second submarginal cell and a little behind into third discoidal cell, tips of fore wings faintly, but rather broadly dark; basal joint of antennae pale below, the flagellum is also paler below than above. A fine silvery white pile on clypeus, lower face, orbits, hardly as prominent on borders of pronotum, mesopleura, mid and hind coxae, over posterior part of propodeum, and in certain views on all of first and parts of second and third abdominal segments.

Clypeus not extended laterally under eyes, hardly three times as broad as long, lower edge truncate, surface with fine hairs; face higher than broad, vertex scarcely convex, some short hairs on upper front and vertex, one or two each side longer, second plus third joints of antennae not equal to vertex-width; ocelli small, laterals nearer

to each other than to eyes. Pronotum broadly concave behind, with a few fine hairs, mesonotum with one or two long erect hairs on each side; propodeum a little longer than broad, from side it is evenly tho' slightly curved, posterior part shows some hairs each side; abdomen with a short petiole, basal segment fully as long as broad behind, the upper side of all segments beyond third has numerous short and fine hairs, the venter with hairs on all segments, but longer on last; legs moderately slender, the mid and hind tibiae with minute short bristles above, inner spur of hind tibia more than one-half of basitarsus.

In fore wings the marginal cell is nearly its length from wing-tip, as broad as third submarginal cell, the second submarginal small, about one and one-half times as long below as broad, base oblique, receiving the first recurrent near middle, third submarginal cell once and one-half longer than second, scarcely longer than second above, outer vein sloping and then bent near end, receiving the second recurrent (straight) before middle; basal vein ends plainly before transverse; in hind wings the anal vein ends much before forking of cubitus, outer cross-vein about as near tip of radial sector as to base.

Length of fore wing 5 mm.

One female, El Campamiento, Col. Perene, Peru, June 1920 (Cornell Univ. Exped.).

Ameragenia partita spec. nov.

♀ Body black, first and second segments of abdomen mostly rufous, the petiole black, and apical part of second segment on venter black; antennae and legs black; fore wings faintly fumose, a brown band in basal part of marginal cell, second submarginal, and in upper part of third discoidal cells, tip of wing dark; stigma and veins brown; hind wings hyaline. Some whitish pubescence on lower face and clypeus.

Clypeus short, over three times as broad as long, narrowly truncate below, sides rather long, slightly convex, with minute hairs below middle; face broad, scarcely narrowed above, frontal line indistinct except below, second plus third antennal joints not nearly equal to vertex-width; ocelli in a close triangle, hind ones fully twice as near each other as to the eyes, short faint hairs on front, some erect and longer on vertex. Pronotum short, sloping in front, very broadly arcuate behind and there with a band of whitish pubescence, mesonotum arched; propodeum short, from side a gently curving slope,

densely long-haired, pleura hairy. Abdomen fusiform, widest at tip of second segment, last three segments above with a few hairs, and bristles just before tip, venter with short hairs. Legs slender, mid tibiae with very minute bristles above, hind tibiae with two rows of short black spines, inner row with more numerous spines, inner spur fully one-half of basitarsus.

In fore wings the marginal cell is nearly two-thirds its length before wing-tip, broader than the second submarginal cell, latter rather small, nearly twice as long below as broad, base oblique, receiving first recurrent vein at middle; third submarginal cell fully one and one-half times as long below as the second cell, much broader, but little narrowed above, the outer side straight and only a little oblique, the third abscissa fully twice the fourth, the second recurrent vein (nearly straight) ends at basal third of cell, end of cell not nearly its length from outer margin.

Stigma moderately long, but tip obliquely truncate, and extending hardly its width into marginal cell; basal vein ends plainly before transverse; in hind wings anal vein ends barely before forking of cubitus.

Length of fore wings 6 mm.

One female from Tumatumari, British Guiana, July (F. X. Williams) Type M. C. Z. no. 26766.

Ameragenia similaris spec. nov.

♀ Head, thorax, propodeum black, abdomen dark rufous, legs black, except the front tibiae and tarsi are somewhat rufous; antennae dark brown, front and clypeus sericeous, also on collar and lower lobes of pronotum, all coxae more or less plainly silvery, also mesopleura and sternum, a band across base of propodeum, and a large spot each side near tip of propodeum; abdomen with a faint bloom. Fore wings hyaline, two dark bands, one, narrow, over basal vein, other occupying most of marginal cell, all of second and half of third submarginals and apical half of third discoidal cell; tip of wings faintly fumose; stigma very small, yellowish. But little hair, on vertex a few long hairs, one long one each side on mesonotum, shorter hair on posterior slope of propodeum, a few on front coxae, last segment of abdomen quite densely hairy above, and about as much as usual on venter.

Clypeus nearly three times as broad as long, sides convex, lower margin slightly convex; face broad below, plainly narrowed at vertex,

frontal groove distinct, vertex-width greater than second plus third antennal joints, ocelli in low triangle, hind ocelli as near eyes as to each other, and these ocelli close to upper margin of occiput; pronotum steeply sloping in front, shouldered each side, behind angulate in middle, upper part short.

Propodeum short, from side steeply curved to tip, with a strong lens it is minutely striate near and above turn. Abdomen with moderate petiole, second segment large and broad, but not broader than propodeum; legs rather long, mid tibiae with fairly long bristles above, hind tibiae above with a double row of spines, inner ones quite long; inner spur only about one-third of basitarsus.

In fore wings the marginal cell almost its length from wing-tip, tip of cell broad and almost blunt; stigma small and very slender, lower margin yellow, surface of stigma clear; width of marginal cell nearly equal to second submarginal cell, latter but little longer below than broad, base slightly rounded, receiving the first recurrent vein at middle; third submarginal cell nearly twice as long below as the second, and only one-half as long above as below, the outer side strongly sloping and then strongly curved down to lower margin, this cell thus extending far beyond the marginal cell, and less than its length from the outer margin of wing; receiving the second recurrent (slightly curved) at middle; basal vein ends a little before transverse; in hind wings the anal vein ends before forking of cubitus.

Length of fore wing 7 mm.

From Campinas, Estado Sao Paulo, Brazil, February (F. X. Williams). Type M. C. Z. no. 26764.

In general very similar to *Priophanes rufigaster*, but the armature of hind tibiae different; legs mostly black, head more sericeous, stigma much more slender and pale, and the much longer third submarginal cell, and shorter inner spur.

Ameragenia notabilis spec. nov.

♀ Body jet black, except that the pro- and mesonotum are rufous; lower half of clypeus yellowish, antennae deep black, mid and hind legs brown to black, front legs mostly yellowish or yellowish brown; fore wings hyaline or faintly yellowish, with two brown bands, one, narrow, over basal vein, other short, in basal part of marginal, all of second submarginal and upper part of third discoidal cells; tip of wing faintly dark; stigma and veins brown, hind wings hyaline. Little hair on body, two long erect ones on vertex, some on hind

part of propodeum, and fine ones on tip of abdomen and on venter; mesopleura and propodeum behind more or less sericeous.

Clypeus about two and one-half times as broad as long, the sides and lower margin joined in an even curve; face broad, narrowed a little above, vertex-width greater than second plus third antennal joints, frontal groove indistinct, hind ocelli much nearer each other than to eyes; pronotum short, sloping in front, arcuate behind; mesonotum a little arched, propodeum nearly as broad as long, from side the posterior slope weakly separated from the basal part. Abdomen mostly shining above, slender, fusiform, petiole rather long; legs slender, mid tibiae with short weak spines above, hind tibiae with a median and an outer row above, inner spur hardly one-half of basitarsus.

In fore wings the marginal cell is not quite two-thirds its length from wing-tip, end of cell rather blunt, fully as broad as second submarginal cell, latter about one and one-fourth times as long below as broad, base strongly curved, receiving the first recurrent vein near middle; third submarginal cell nearly one and one-half times as long below as second, end of cell moderately oblique and curved, third abscissa of radius longer than fourth, second recurrent vein (slightly curved) ends at or a little before end of basal third, end of this cell not its length from wing-margin; basal vein ends plainly before transverse; in hind wings the anal vein ends much before forking of cubitus.

Length of fore wing 5 mm.

From Bucay, Ecuador, 1000 ft., 10 October (F. X. Williams). Type M. C. Z. no. 26765, paratype with Mr. Williams.

Ameragenia notabilis var. hilaris var. nov.

Differs in color from *notabilis* in having the rufous over the lower mesopleura as well as upper, and the front and middle femora and tibiae are plainly pale yellowish (much darkened in *notabilis*).

The clypeus is more than three times as broad as long, truncate below; face much higher than broad, vertex a little more than second plus third antennal joints; hind ocelli nearer to each other than to the eyes; pronotum very short in middle, angulate behind, shoulders rather prominent; propodeum tapering a little behind, base indented in middle, sides nearly vertical. Abdomen as broad as propodeum, last segment with mostly short, yellowish hair; hind tibiae with a row of short, stiff bristles above, and many others on outer side,

mostly in rows; mid tibiae with numerous little spines above, inner spur not one-half of basitarsus.

Marginal cell more than one-half its length from wing-tip, nearly four times as long as broad, broader than second submarginal, latter has both ends oblique and nearly parallel, receiving the first recurrent vein near middle; third submarginal cell over one-half longer below than second, more than one-half as long above, outer side oblique and evenly curved, receiving the second recurrent vein (evenly curved) before end of basal third, end of cell little more than one-half its length from wing margin; basal vein ends plainly before transverse, its lower section oblique, little curved; in hind wings anal vein ends much before forking of cubitus.

Length of fore wings 6.5 mm.

One from between Queremal and Buenaventura, Colombia, 3500 to 4000 ft., 12 February (H. F. Schwarz). Type in Amer. Mus. Nat. Hist.

It is a much larger form than the typical *notabilis* of Ecuador, the tarsi appear proportionally longer, but it is partly, at least, due to larger size.

Ameragenia dolorosa spec. nov.

♀ Body deep black throughout, antennae and legs also. Wings hyaline, fore wings with narrow brown band over basal vein, a broader band behind stigma, covering second submarginal cell and well into third discoidal cell, apex of wing brown, veins and stigma dark brown; whitish pubescence over lower face and clypeus and coxae, not at all prominent. Head, thorax, pleura, and propodeum very hairy, tip of abdomen with some stiff hairs, and finer ones on venter.

Clypeus fully two and one-half times as broad as long, lower edge from eye to eye in a nearly even curve; face broad, plainly narrowed above, frontal line faint, vertex-width not quite as long as second plus third antennal joints; ocelli in a rather narrow triangle, hind ones much closer to each other than to eyes; antennae long and slender, reaching well beyond propodeum, not quite as long as in *setaceicornis*.

Pronotum moderately sloping in front, very short above, arcuate behind; propodeum moderately long, from side slightly but nearly evenly curved, median groove distinct behind. Abdomen with a rather short petiole, broadest near end of second segment, above with a few hairs on third and fourth segments as well as beyond.

Legs slender, mid tibiae slender, with rather long bristles above,

hind tibiae also very long, with two rows of bristles, the outer row with shorter and fewer ones, inner spur one-half basitarsus.

In fore wings the marginal cell is very long and acute at tip, not one-half its length from wing-tip, not quite as far as in *setaceicornis*, in width broader than second submarginal cell, latter fully twice as long below as broad, base oblique and curved, receiving the first recurrent vein near middle; third submarginal cell longer below than second, narrowed hardly one-third above, receiving second recurrent vein (slightly curved) near end of basal third, cell hardly two-thirds its length from outer margin; stigma long, slender, extending into marginal cell much more than its width, lower side convex; basal vein ends much before transverse, not bulging; in hind wings anal vein ends a little before forking of cubitus.

Length of fore wing 7 mm.

One female from Tena, Ecuador, 27 March (F. X. Williams). Type in M. C. Z. no. 26767.

AMERAGENIA CLEORA spec. nov.

Body black, antennae brownish to black, front tibiae and tarsi yellowish, mid tibiae sometimes rufous below, rest of legs black; body strongly iridescent. Wings yellowish hyaline, the second submarginal cell brown, which extends into upper part of third discoidal cell; veins brown, stigma black. Clypeus and lower face silvery sericeous, less prominent on under side of coxae, lower mesopleura, and posterior part of propodeum. Some hairs on clypeus, a few long ones on vertex, cheeks and under side of head hairy, some rather short on the scutelli and hind part of propodeum, longer on tip of abdomen, shorter on venter.

Clypeus fully two and one-half times as broad as long, lower edge convex; face higher than broad, little narrowed above, median line indistinct; second plus third antennal joints not nearly equal vertex-width; lateral ocelli nearer each other than to eyes; pronotum short above, almost angulate in middle behind; propodeum short, no median groove, from side nearly evenly curved. Petiole of abdomen moderately long, much as in *festina*; legs not very long, hind femora not reaching tip of abdomen, mid and hind tibiae with numerous short, erect black bristles in rows, inner spur of hind tibiae about one-half of basitarsus.

In fore wings the marginal cell is about two-thirds its length from wing-tip, nearly as broad as the third submarginal cell; stigma long,

outer part ends in a sharp point; second submarginal cell fully one and one-half times as long below as broad, narrowed one-third above, receiving the first recurrent vein at middle; third submarginal cell nearly one-half longer below than second, narrowed more than one-third above, outer vein slightly curved, receiving the second recurrent vein (scarcely curved) near basal third; basal vein ends much before the transverse; in hind wings the anal vein ends before forking of cubitus, outer cross-vein about one-half way out on the radial sector.

Length of fore wings 6 mm.

Two females from Nova Teutonia, Santa Catharina, Brazil, 17 June (Plaumann). Type M. C. Z. no. 26610.

Priophanes Banks (Figs. 29, 30)

Table of females

1. Abdomen at least partly rufous 2
   Abdomen black; fore wings with dark spot or band 9

2. Thorax and propodeum rufous 3
   Thorax and propodeum black 4

3. Fore wings with two dark bands, narrow over basal vein, broader one behind stigma; inner spur fully half of basitarsus ..... *bradleyi*
   Fore wings with three bands and tip dark, broad band over basal vein, two narrow and fainter; inner spur not one-half of basitarsus ..... *pictipennis*

4. Fore wings nearly evenly dark brown 5
   Fore wings almost hyaline or partly fumose at tip, or banded .. 6

5. Hind femora yellowish rufous, contrasting with tibiae ..... *rufofemorata*
   Hind femora dark as the tibiae ..... *basirufa*

6. Head, thorax, propodeum black with various large creamy-white spots ..... *ornata*
   No large pale spots, except pubescence 7

7. Fore wings with two dark bands, and tip dark ..... *rufigaster*
   No bands except dark on tip 8

8. Pronotum sloping steeply in front, surface hairy; mesonotum arched ..... *posticata*
   Pronotum sloping gently, surface not hairy, mesonotum scarcely arched ..... *otiosa*

9. Thorax and propodeum rufous; fore wings with two bands and tip dark ..... *comes*
   Thorax and propodeum black 10

10. Hind femora rufous; spot or short band behind stigma; very hairy species 11
Hind femora as dark as the others 13

11. Only the hind femora rufous; clypeus convex below; dark band over basal vein; anal in hind wing ends at forking of cubitus ..... *insolens*
Mid femora also rufous; anal vein in hind wing ends before forking of cubitus 12

12. Only mid and hind femora and partly front femora rufous; all tibiae and tarsi black; band over basal vein; clypeus convex below ..... *eudora*
Mid and hind femora, tibiae, and basitarsi rufous; no band over basal vein; clypeus truncate below ..... *erythropoda*

13. Clypeus rounded below, tending to a point in middle; two dark bands on fore wings; in hind wings anal vein ends plainly before forking of cubitus 14
Clypeus truncate or tridentate below, almost parallel to upper margin; in hind wings anal vein often ends at or very close to forking of cubitus 16

14. Antennae black; legs all black; propodeum angularly indented in middle of front margin, no median line ..... *marcida*
Antennae yellowish, except tip; propodeum not plainly indented in middle of front margin 15

15. Pronotum short above; sericeous mostly only on coxae and mesosternum ..... *pallicornis*
Head, thorax, and propodeum above covered with sericeous pubescence, as well as on coxae and pleura; some on abdomen; pronotum quite long above ..... *sericosoma*

16. Entire fore wings blackish ..... *nigerrima*
Some hyaline areas on fore wings 17

17. Two distinct bands on fore wings 18
But one band on fore wings; second recurrent but little curved ... *plagosa*

18. Thorax, pleura, propodeum with several prominent sericeous spots; a triangular indentation on middle of front margin of propodeum ..... *major*
No distinct sericeous spots; no indentation ..... *moesta*

PRIOPHANES BRADLEYI spec. nov.

Body rufous, a black spot on vertex over ocellar area and extending a short distance on front, two small black spots on hind border of mesonotum, petiole of abdomen and all but the first and half of second segment black; legs and antennae rufous; wings hyaline, two brown

bands, one over basal vein, a broader one behind stigma, stigma and veins brown. Only short and sparse hair on body, some on front, clypeus, hind part of propodeum, tip and venter of abdomen.

Clypeus about three times as broad as long, the lower edge rounded; face plainly higher than broad, orbits nearly parallel, frontal groove indistinct, antennae short, second plus third joints not nearly equal to vertex-width; ocelli in rather broad triangle, laterals nearer each other than to eyes; pronotum longer above than usual, evenly curved to collar, behind angulate in middle; mesonotum arched; propodeum a little broader at base than long, evenly rounded, no median groove; petiole of abdomen moderately long, first three segments shining above. Front and mid legs rather short, hind pair quite long; mid tibiae above with few very short, spine-like bristles, hind tibiae above with distinct teeth all along, the hairs and bristles extremely minute, inner spur reaching beyond middle of basitarsus.

In fore wings the marginal cell is pointed at tip, almost its length from wing-tip, a little broader than the second submarginal cell; stigma scarcely reaching into marginal cell, obliquely truncate at tip; second submarginal cell nearly one and one-half times as long below as broad, narrowed above more than a third, receiving the first recurrent vein at basal third; third submarginal cell almost one-half longer below than second, but nearly the same length above, narrowed about one-half above, outer vein curved, receiving the second recurrent vein (nearly straight) before end of basal third; basal vein ends a little before transverse, lower section bowed; in hind wings anal vein ends plainly before forking of cubitus, outer cross-vein before middle of radial sector.

Length of fore wing 6 mm.

One female from Tintina, Santiago d. Estero, Argentina, 21 February (Cornell Univ. Exped.).

Priophanes rufofemorata Taschenberg (Priocnemis)

From Cosquin, Sierra de Cordoba, Argentina 1–9 March (Cornell Univ. Exped.).

Described as a Priocnemis from Argentina.

Priophanes basirufa Fox (Salius)

From La Rioja, Argentina (Giacomelli); Pic de Palo San Juan, Argentina, 11 March (Cornell Univ. Exped.); Santa Cruz, Bolivia,

(Steinbach); and Urucum, Corumba, Brazil, 23 to 29 December (Cornell Univ. Exped.). Described as a Salius (Priocnemis) from Chapada, Brazil; also from Villa Americana, Brazil, February and Campinas, Sao Paulo, Brazil, March, both from Mr. F. X. Williams.

PRIOPHANES POSTICATA spec. nov.

Head and thorax black, abdomen rufous, antennae and legs brown, the antennae below and hind femora verging a little on rufous; wings hyaline, hind wings fumose at tip, but fore wings much more broadly, reaching faintly into marginal and second submarginal cells; stigma and veins brown. Scattered, mostly short, hairs on body, but much longer ones on last segment above and below. Sericeous over much of body, noticeable on clypeus, lower face, spot above base of antennae, underside of coxae, lower mesopleura, and an elongate spot each side near tip of propodeum.

Clypeus three times as broad as long, lower margin truncate, nearly parallel to upper margin, with a few long bristles; face little higher than broad, scarcely narrowed on vertex, frontal groove distinct, ocelli in a rather broad triangle, but laterals a little nearer each other than to eyes; second plus third antennal joints not equal to vertex-width; pronotum scarcely any on top in the angulate middle part, frontal slope very steep; mesonotum arched; propodeum not quite as broad as long, no median groove, from side slightly, evenly curved. Petiole of abdomen of moderate length, basal segment quite short. Legs rather long and slender, mid tibiae above with many short, spine-like bristles, hind tibiae above with distinct teeth all along, but the very minute hairs and bristles hardly visible, inner spur not one-half of basitarsus.

In fore wings the marginal cell almost its length from wing-tip, scarcely broader than second submarginal cell; stigma extending its width into marginal cell, but tip obliquely truncate; second submarginal cell fully one and one-half times as long below as broad, narrowed one-fourth above, receiving the first recurrent vein a little beyond middle, third submarginal cell one-third longer below but hardly any longer above than second, narrowed one-third above, outer vein scarcely curved, receiving second recurrent vein (about straight) at middle, basal vein ends much before transverse, scarcely bulging; in hind wings anal vein ends plainly before forking of cubitus, outer cross-vein fully one-half way out on radial sector.

Length of fore wings 8.5 mm.

One female from La Rioja, Argentina (Giacomelli coll.) (Cornell Univ.).

PRIOPHANES OTIOSA spec. nov.

Head, thorax, propodeum, and legs black, antennae also black, abdomen rufous, extreme tip slightly darker and petiole black; wings hyaline, tip broadly brownish, veins and stigma brown.

Clypeus and lower face sericeous, under sides of coxae, a little on lower mesopleura, pronotum and a spot each side behind on propodeum.

Clypeus fully three times as broad as long, lower edge nearly truncate, a few bristles on surface; face nearly as broad as high, little narrowed above; second plus third antennal joints hardly more than two-thirds of vertex-width, no frontal groove, lateral ocelli very much nearer to each other than to eyes; pronotum longer above than usual, curved in front to collar, angulate in middle behind; propodeum hardly as broad in front as long, no median groove, from side evenly curved, quite hairy on posterior slope.

Petiole not very long, tip of abdomen rather hairy above, fewer below. Legs not very long, mid tibiae with some short spines above, hind tibia with a row of short spines at tip of minute teeth, inner spur not more than one-third of basitarsus.

In fore wings the marginal cell is fully its length from wing-tip, the apex of cell being rather blunt, its breadth hardly as great as the second submarginal cell; the stigma short and obliquely truncate at tip, not far into marginal cell. Second submarginal cell one and one-half times as long below as broad, narrowed nearly one-third above, receiving first recurrent vein at middle; third submarginal cell hardly one-third longer below than second, narrowed fully one-third above, outer vein much curved, receiving the second recurrent vein (slightly curved) near middle; basal vein ends much before transverse, latter not oblique; in hind wings anal vein ends much before forking of cubitus, outer cross-vein before middle of radial sector.

Length of fore wing 6 mm.

One female from Santa Cruz, Bolivia (Steinbach). Type M. C. Z. no. 26641.

PRIOPHANES INSOLENS spec. nov.

Body black, antennae also, legs brown to black, except hind femora are dull rufous, tibiae mostly black, but mid and hind tarsi brown, spurs almost white. Wings hyaline, fore wing with brown band on

basal vein, and a broader one behind stigma, tip dark, veins and stigma brown.

Clypeus and lower face strongly sericeous, also coxae beneath, mesosternum and lower mesopleura, and large spots each side behind on propodeum nearly meeting in middle.

Clypeus about two and one-half times as broad as long, sides more sloping than *plagosa*, lower margin truncate, surface hairy, face higher than broad, scarcely narrowed above, frontal line distinct, second plus third antennal joints not quite equal vertex-width; ocelli in broad triangle, but laterals much closer to each other than to eyes; front with much white hair, slightly longer on vertex, back of head densely long white-haired; pronotum with scarcely any dorsal part, curved on front, hind border broadly arcuate; pleura hairy; propodeum as broad at base as long, from side evenly curved, with much white hair on posterior slope. Petiole of abdomen quite long, tip of abdomen very hairy above and below, few, but rather long, hairs on venter. Legs long, hind femora fully reaching tip of abdomen; mid tibiae with numerous stiff bristles above and some below, hind tibiae above with short, stiff bristles and distinct teeth for more than basal half, inner spur about one-half of basitarsus.

In fore wings marginal cell is more slender than *plagosa*, not two-thirds its length from wing-tip, broader than second submarginal cell; latter almost twice as long below as broad, narrowed fully one-third above, receiving first recurrent vein beyond middle; third submarginal cell one-half longer below than second, narrowed fully one-third above, outer side strongly sloping and curved towards lower end, receiving the second recurrent (curved in middle) plainly before middle; basal vein only a little before transverse, lower section quite strongly bowed; the transverse vein is oblique; in hind wings anal vein ends a little beyond forking of cubitus, outer cross-vein fully one-half way out on radial sector.

Length of fore wings 11 mm.

One female from Nova Teutonia, Santa Catharina, Brazil, 30 January (Plaumann). Type M. C. Z. no. 26637.

Priophanes erythroptera spec. nov.

Black, antennae also black, front legs black to brown, mid and hind legs rufous except coxae and tips of tarsi; wings lightly fumose, a brown cloud in second submarginal cell and spreading a little outside; stigma long, black, part in cell rounded behind, veins brown.

Clypeus about two and one-half times as broad as long, rounded below; face higher than broad, narrowed above, frontal groove distinct, some hairs on front and vertex; antennae rather long, joints two plus three equal vertex-width; lateral ocelli much closer to each other than to eyes; pronotum short above, sloping in front, behind barely angulate in middle, short hair; mesonotum scarcely arched; propodeum about as broad in front as long, tapering somewhat behind, from side sloping, little curved, behind hairy.

Abdomen with a long petiole, at tip with some very short, stiff hairs and longer fine one, also some on preceding segment, venter with few hairs. Legs long, hind femora reach about to tip of abdomen; mid tibiae with numerous short bristles above; hind tibiae with distinct spines from base to tip, and two rows of short stiff bristles above, inner spur not reaching middle of basitarsus.

In fore wings marginal cell long, about two-thirds its length from wing-tip, much broader than second submarginal cell; latter almost twice as long below as broad, narrowed nearly one-third above, receiving the first recurrent vein plainly beyond middle; third submarginal cell one-fourth longer below than second, but about same length as second above, outer vein much sloping, curved near end, receiving the second recurrent (little curved) at middle; basal vein sloping, ending far in front of transverse; in hind wings anal vein ends much before forking of cubitus, outer cross-vein a little before middle of radial sector, not oblique.

Length of fore wing 12 mm.

One female from Est. Sao Paulo, Brazil (Hammar coll. Cornell Univ.).

Priophanes marcida spec. nov.

Very similar to *P. plagosa* in color and sericeousness; the fore wings have a distinct dark band over basal vein, and the stigmal band is rather broader; veins and stigma dark brown to black. The clypeus is strongly rounded below, so that it is about two and one-half times as broad as long, surface with few hairs; face a little higher than broad, plainly narrowed above, lateral ocelli nearer each other than to eyes; pronotum more sloping than in *plagosa*; second plus third antennal joints equal vertex-width; propodeum as broad at base as long, indented in middle of base (not in *plagosa*), from side evenly curved, above with rather long hair on posterior part; abdomen as in *plagosa*, but with more hair at tip and longer on venter. Legs slender, hind

femora not quite reaching tip of abdomen; mid tibiae with stout short bristles above, hind tibiae with similar bristles, but teeth scarcely as distinct as in *plagosa*, showing on apical part as low ridges, inner spur almost one-half of basitarsus.

In fore wings the marginal cell is about two-thirds its length from wing-tip, plainly broader than second submarginal cell, latter fully one and one-half times as long below as broad, narrowed one-fourth above, receiving the first recurrent vein beyond the middle; third submarginal cell more than one-half longer below than second, narrowed nearly one-third above, not so broad as in *plagosa*, outer side sloping, nearly straight, receiving the second recurrent vein (nearly straight) much before middle; basal vein ends plainly before transverse, little curved; in hind wings the anal vein ends before forking of cubitus, outer cross-vein fully one-half way out on radial sector.

Length of fore wing 9 mm.

Four females from Nova Teutonia, Santa Catharina, Brazil, 8 Oct., 25 Aug., 11, 25 January (Plaumann). Type M. C. Z. no. 26639. Readily separated from *P. plagosa* by longer clypeus, indented base of propodeum, etc.

Salius (*Priocnemis*) *varipes* Fox is probably close to this species differing only in color of legs. Two other species of the genus have the pit at base of propodeum, *eudora* and *major*, but in neither case will they agree in markings with *marcida*.

Species of Ameragenia which have this pit do not have teeth on hind tibiae. It may be that more importance should be attached to this pit as a generic character.

Priophanes nigerrima Fox (Salius)

From Vista Nieve, San Lorenzo Mt., Colombia, 16 December, (J. Bequaert).

Priophanes pallicornis spec. nov.

Body jet black; lower edge of clypeus rufous, antennae rufous to almost brown at tip; femora black or dark brown, front tibiae and tarsi yellowish, mid tibiae almost as pale, hind tibiae dark, mid and hind tarsi yellowish except dark tip. Wings hyaline, veins brown, stigma black, fore wings with two dark bands, one over basal vein, a broader one over second submarginal, basal third of marginal, and apical half of third discoidal cell, tip of wing faintly darker. Body very sparsely haired, mostly very short, but fairly long on front

coxae, not so long on hind part of propodeum and tip of abdomen; coxae and mesosternum with silvery pile.

Clypeus fully two and one-half times as broad as long, lower edge nearly truncate; face a little higher than broad, vertex as wide as base and very much longer than second plus third joints of the short antennae, no frontal line, ocelli in a fairly broad triangle; laterals much nearer to each other than to eyes. Pronotum very short on top, angulate in middle, in front rather long and steeply sloping; mesonotum scarcely arched; propodeum nearly as broad in front as long, from side evenly curved, median groove distinct on basal part. Petiole of abdomen fairly long; basal segment not very broad, second much broader, tip rather blunt. Legs short, hind femora not nearly reaching tip of abdomen, mid tibiae with a row of short stiff bristles above, hind tibiae with a row of rather long, low teeth nearly to tip, very short bristles above, inner spur not quite one-half of basitarsus.

In fore wings the marginal cell is scarcely its length from tip of wings, little broader than second submarginal cell, stigma moderately long, but obliquely truncate at tip; second submarginal cell about one and one-half times longer below than broad, narrowed one-half above, receiving the first recurrent vein near basal third; third submarginal cell hardly one-third longer below than second, and barely longer above, narrowed nearly one-half above, outer vein little curved, receiving the second recurrent vein (straight) at basal third; basal vein ends before transverse, lower sector bulging towards base; in hind wings anal vein ends much before forking of cubitus, outer cross-vein not oblique, at about middle of radial sector.

Length of fore wings 7 mm.

One female from Estado Sao Paulo, Brazil (Hammar coll. Cornell Univ.).

Priophanes plagosa spec. nov.

Body black, also antennae and legs; wings hyaline, tip of fore wings dark and a dark mark over second submarginal cell and into base of marginal and upper part of third discoidal cell, veins and stigma black. Coxae beneath strongly sericeous, less strongly on clypeus and lower face, hind margin of pronotum, a large spot each side behind on propodeum, and less distinct on abdomen.

Clypeus fully three times as broad as long, lower side truncate and nearly parallel to upper edge, with hair nearly all over; face higher than broad, but little widened in middle and scarcely narrowed on

vertex; frontal line scarcely discernible; ocelli in a small triangle, laterals almost twice as near each other as to eyes; joint two plus three of antennae equal vertex-width; long hair on vertex, much shorter on front; pronotum extremely short above, nearly all slope, hind margin but slightly arcuate, with short hair; mesonotum slightly convex, pleura with short hair; propodeum as broad at base as long, from side evenly curved, above with white hair, no median groove. Petiole of abdomen quite long, second segment much wider than first, tip with rather short hair, much shorter on venter. Legs not very long, hind femora not reaching tip of abdomen; mid-tibiae with short stout bristles above; hind tibiae with similar bristles but also short but distinct teeth on basal half, inner spur fully one-half of basitarsus. In fore wings the marginal cell is about two-thirds its length from wing-tip, plainly broader than second submarginal cell; latter one and one-half times as long below as broad, narrowed one-fourth above, receiving first recurrent vein barely beyond middle; third submarginal cell one and one-half times as long below as second, narrowed one-fourth above, outer side slightly curved and sloping, at widest nearly twice as wide as second, receiving the second recurrent vein (but little curved) much before middle; basal vein ends plainly before transverse, but little curved; in hind wings the anal vein ends slightly before forking of cubitus, outer cross-vein about at middle of radial sector.

Length of fore wing 8 to 9 mm.

Eight females from Nova Teutonia, Santa Catharina, Brazil, 19 December, 6, 18, 25 January (Plaumann), and also apparently the same species from Puerto Bermudez, Peru, 12, 19 July, and Tucuman, Argentina (Reed) (Cornell Univ.). These are rather smaller, but differ only in minor details. Type M. C. Z. no. 26640.

Priophanes comes spec. nov.

♀ Head and abdomen black, thorax rufous, legs mostly brownish, front and mid femora yellowish at tip, tarsi yellowish brown, antennae brown to dull black, beyond middle rather yellowish brown below; fore wings hyaline, a narrow brown band over basal and transverse veins, a much broader band covering marginal and extending over third discoidal cell, tip rather broadly pale brown and between it and the broad band the membrane is plainly white; hind wings hyaline. Face with four silvery streaks one each side by eye and one above each antenna; clypeus, coxae, and propodeum also silvery. Scarcely

any hair on body; two long erect hairs on vertex, some at tip of abdomen and on venter, front coxae with a few very fine white hairs.

Clypeus fully three times as broad as long, below tridentate, a rather prominent pointed tooth in middle, and at end of each slight lateral emargination is a smaller, decumbent tooth. Face nearly as broad as high, but little narrowed above; there is a slight ridge above each antennae reaching nearly to ocelli, the frontal line indistinct; vertex-width greater than second plus third antennal joints; ocelli in a low triangle, hind ones much nearer each other than to eyes.

Pronotum sloping in front, broadly arcuate behind; propodeum short, from side sloping from near base to tip, scarcely curved, only a few faint hairs toward tip. Abdomen with a rather long petiole, second segment much broader than first, hind margin of second and other segments behind more or less silvery. Legs moderately long, mid tibiae slender, with short bristles above, hind tibiae with row of oblique teeth, each with a minute spine at tip, and on the outer side a row of short spines; inner spur about one-half of basitarsus.

In fore wings marginal cell about three-fourths its length from wing-tip, broader than second submarginal cell, latter twice as long below as broad, base strongly oblique and curved, receiving first recurrent vein before middle; third submarginal cell below about one and one-half times as long as second and much broader, outer side scarcely curved, strongly oblique, the cell not its length from margin of wing, receiving the second recurrent vein (nearly straight) barely beyond middle; basal vein ends plainly before transverse; the stigma is long and extends into marginal cell more than its width; in hind wings the anal vein ends before forking of cubitus.

Length of fore wing 7 mm.

One female of this handsome species from Jabaty, Para, Brazil, May (F. X. Williams). Type M. C. Z. no. 26760.

Priophanes sericosoma spec. nov.

Body black, covered practically all over, even on venter, with sericeous pubescence, but not really silvery, on face faintly golden; lower half of clypeus and the mandibles yellowish; antennae yellowish, toward tip darker to brown; front legs almost wholly yellowish, trochanters black, mid and hind femora nearly black, tips yellowish, tibiae and tarsi also yellowish; fore wings hyaline, with two very dark brown, almost black, bands, one over basal vein, rather narrow, other very broad covering third discoidal and apical part of second, over all of second submarginal cell and in apical part of first sub-

marginal, not in third, tip of wings dark; stigma yellowish brown; veins yellowish, but in dark areas they are nearly black; hind wings hyaline. Little hair except on posterior part of propodeum, tip of abdomen, and on venter.

Clypeus three times as broad as long, the lower margin rounded a little and coming to a point in middle; but not a projecting point. Face very broad, scarcely narrowed above, frontal groove hidden; ocelli in a low triangle, hind ones much nearer each other than to eyes; vertex-width very much greater than second plus third antennal joints; pronotum moderately long above, hardly angulate behind, steeply sloping in front, propodeum rather low, from side in an even slight curve, no pit at middle of base; abdomen fusiform, widest a little behind middle of second segment; legs rather short, mid tibiae with short, pale spines above, hind tibiae with a row of slightly oblique teeth, each tipped by a short spine, outer row of spines so small and pale as to be unnoticed, inner spur almost one-half of basitarsus.

In fore wings marginal cell nearly its length from tip, as broad as second submarginal cell, latter more than one and one-half times as long below as broad, base sloping, receiving first recurrent vein before middle; third submarginal cell about one and one-fourth times as long below as second, outer side oblique and curved narrowing cell to almost half the lower side; receiving the second recurrent much before middle; basal vein ends plainly before the transverse; third discoidal cell very large; in hind wings the anal vein ends before transverse.

Length of fore wing 5.5 mm.

One female from Campinas, Sao Paulo, Brazil, March (F. X. Williams). Type M. C. Z. no. 26761.

The male is very similar to female in color, antennae wholly reddish yellow, lower face and clypeus, mesopleura, mid and hind coxae, and a spot each side at tip of propodeum strongly silvery; legs yellowish, hind femora and bases of mid femora black, hind tarsi more brown; wings with the two bands, but less broad. The clypeus is yellowish, except a small black square in the middle, a yellow stripe narrowing up each orbit, both covered with silvery pubescence. Clypeus nearly three times as broad as long, lower margin truncate, parallel to upper margin. Tip of abdomen and subgenital plate rufous, tip of plate truncate. Abdomen with a long, slender, petiole, beyond the abdomen is quite broad and flattened a little, not at all compressed. Venation the same as in the female.

Length of fore wings 5 mm.

Several from Campinas, Sao Paulo, Brazil, March (F. X. Williams),

Priophanes rufigaster spec. nov.

♀ Head, thorax, propodeum black, abdomen rufous, antennae yellowish brown to dark brown, beneath paler; femora dark reddish brown to black, tibiae yellowish to rufous, tarsi dull yellowish brown; fore wings nearly hyaline with two dark bands, one narrow over basal vein, other occupying base of marginal, all of second submarginal and upper part of third discoidal cells, tip of wing faintly fumose, stigma dark brown, veins a paler brown; hind wings hyaline. Face from just above antennae down over clypeus sericeous, upper margin sharply marked; mid coxae and lower mesopleura strongly silvery or yellowish, hind coxae also; little hair anywhere except tip of abdomen, a few short on venter, propodeum, and front coxae.

Clypeus about two and one-half times as broad as long, lower margin from eye to eye evenly convex; face broad, slightly narrowed above, vertex-width much greater than second plus third antennal joints; ocelli in a low triangle, hind ocelli about as close to eyes as to each other, frontal line indistinct; pronotum rounded, no median line; from side evenly curved. Abdomen rather broad, broader than propodeum, petiole moderate; legs fairly long, mid tibiae faintly swollen, with short stiff bristles above, hind tibiae with oblique teeth, toward base nearly transverse, inner spur not quite one-half of basitarsus.

In fore wings the marginal cell is fully two-thirds its length from wing-tip, tip of cell acute, hardly as broad as second submarginal cell, latter one and one-third times as long below as broad, base very oblique, receiving the first recurrent vein before middle; third submarginal cell one and one-third times as long below as the second, narrowed one-third above, outer side oblique and curved, receiving the second recurrent vein (nearly straight) at basal third, end of cell not its length from outer margin of wing; stigma rather broad, its tip obliquely truncate and extending only a trifle into marginal cell; basal vein ends a little before transverse, its lower section bulging basally; in hind wings the anal vein ends before forking of cubitus.

Length of fore wing 5 to 5.5 mm.

From Rezende, Est. do Rio, Brazil, February, and Campinas, Est. Sao Paulo, Brazil, February (both taken by F. X. Williams).

Type M. C. Z. no. 26762; paratype with Mr. Williams.

PRIOPHANES PICTIPENNIS spec. nov.

♀ Head, thorax, and abdomen mostly dark rufous, antennae and legs also, antennae becoming almost brown toward tip; propodeum with a large black area in middle, not quite reaching sides nor ends; each abdominal segment above, with a narrow apical band of white pubescence. Fore wings hyaline, with five dark bands; one on basal extending out about half way on basal cell; one, quite broad, and more darkly marked over basal and transverse veins; a third, somewhat fainter, and more narrow, starting just before base of stigma and extending back over base of third discoidal cell, the usual band rather narrow, in basal part of marginal cell, apical part of second submarginal and upper apical part of third discoidal cell, a fifth band over the tip of wing, rather broad, but not reaching the cells; stigma and veins pale brown, but in the dark area some veins are nearly black; hind wings hyaline. Almost no hairs on body, a few across clypeus, two erect long ones on vertex, and two on mesonotum, and some fine white ones toward tip of abdomen above and below.

Head very broad, thorax and propodeum more slender. Clypeus fully two and one-half times as broad as long, the lower margin sloping each side and almost coming to a sharp point in middle; face broad below; narrowed a little toward vertex, latter much broader than length of second plus third antennal joints, vertex roundedly extended above eyes, more than in *otiosa*, so that the hind ocelli are far from top of occiput, hind ocelli very much nearer to each other than to eyes. Pronotum raised but little above collar, a gentle slope forward, hind margin arcuate. Propodeum nearly flat, curved down a bit near tip, much longer than broad. Abdomen fusiform, much broader than propodeum, petiole long, a few hairs above on fourth and fifth segments. Legs long and slender, smooth; hind tibiae with a row of prominent, slightly oblique teeth, with the bristles by the side very small; inner spur about one-third of basitarsus; mid tibiae with numerous short, erect bristles above.

In fore wings the marginal cell is about two-thirds its length from wing-tip, much broader at tip of second submarginal than that cell, latter fully twice as long below as broad, base curved and strongly oblique, receiving the first recurrent vein before end of basal third; third submarginal cell shorter below than second and much narrowed above, third abscissa hardly more than one-half of the second, third and fourth abscissae form a straight line, third cell more than length from outer margin, second recurrent vein (nearly straight, but oblique)

ends plainly before middle of cell; stigma moderately long, but obliquely truncate at tip, so extends but a little into marginal cell; basal vein ends well before transverse; in hind wings the anal vein ends before forking of cubitus.

Length of fore wing 5.5 mm.

One female from Villa Americana, Brazil, February (F. X. Williams). Type M. C. Z. no. 26763.

By the elevated vertex and little hair allied to *P. otiosa*, but thorax and propodeum more slender, pronotum less elevated above collar, and the wing-markings very different. The elevated vertex is very uncommon in Priophanes, but is found in many species of Ageniella.

Priocnemella Banks

Priocnemella hexagona var. omissa var. nov.

Differs from *hexagona* Fox in having antennal joints six, seven, and eight rufous above and below; the golden pubescence of mesonotum is mostly confined to front and hind borders, none on the scutellum, but postscutellum is golden. The wings are rather strongly yellow as in *P. fairchildi* of Panama, there is no trace of the dark spot in the third discoidal cell characteristic of typical *hexagona*. The antennal joints are as in other forms, the fourth joint shorter than fifth.

Length of fore wings 16 mm.

A female from Iquitos San Rogue, Peru, Dec. (Klug coll.) (Cornell). These related forms may be separated as below. (cf. Fig. 31)

1. A dark spot in third discoidal cell; scutellum golden..... *hexagona*
   No dark spot in third discoidal cell; scutellum not golden.... 2
2. No golden on head or thorax; wings bright yellowish..... *fairchildi*
   Some golden pubescence on head and thorax, postscutellum golden..... 3
3. Wings very pale yellowish, golden pubescence on pronotum, over all of mesonotum, and patches of golden or silvery pubescence on pleura; five joints of antennae rufous..... *eurytheme*
   Wings bright yellowish, most of mesonotum not golden, no golden or silvery on pleura, three joints of antennae rufous..... *omissa*

Alasagenia Banks

Table of Species

1. Wings almost wholly black..... 2
   Wings mostly pale; costal margin or bands dark..... 3

2. Wings wholly black, iridescent; body broad, mid and hind femora scarcely, if at all, hairy; the mesosternum projects laterally ..... *pilifrons*
   Wings pale on apical part; body slender, very hairy, even on mid and hind femora and on tarsi; mesosternum scarcely projecting ..... *hirsuta*
3. Fore wings with two dark bands ..... *erichsoni*
   Fore wings with costal area rather broadly dark, behind hyaline 4
4. First discoidal cell hyaline, male only known ..... *cymbele*
   First discoidal cell covered by the dark streak; mesosternum projects laterally in female ..... *corymele*

Alasagenia hirsuta spec. nov.

♀ Body deep black, antennae and legs rather more brown, fore wings dark brown, pale beyond the cells, the pale extending into apical part of marginal and third submarginal cells; hind wings a pale, rather yellowish brown, fading out behind and toward tip, stigma and veins brown to black.

Body slender; head with a distinct malar space; clypeus extending laterally under eyes, about twice as broad as long, lower margin bare and shining, strongly convex; face slightly narrowed above, from in front the vertex is slightly convex, the ocelli elevated a little above vertex, hind ocelli nearer to each other than to eyes; antennae placed well above clypeus, very slender, a few hairs on basal joint, third joint about one and one-half times as long as the fourth and equal to vertex-width.

Pronotum short, sloping in front, hardly angled in middle behind; scutellum high, compressed; propodeum a little longer than broad, from side an even curve, surface transversely ridged; mesosternum scarcely projecting; abdomen with a long petiole, widest on second segment, tapering to a slender tip. Legs very slender and long, hind tibiae have a row of low teeth, and a spine at tip of each, inner spur more than one-third of basitarsus; mid tibiae as long as width of fore wing, above with many small spines, each arising from a tooth-like base, all femora have below and on sides many erect, short, fine hairs, all of one size, front tibiae with many short sloping bristles, mid and hind tibiae with bristles below, and all basitarsi with rows of stout bristles on all sides; claws have a fine short tooth beyond middle.

The head and thorax have many black hairs, all coxae, pleura, and propodeum with longer black hairs, tip of abdomen has a group of stout straight bristles, before it many hairs, a few even on third segment; venter with longer hairs.

In fore wings the marginal cell is about two-thirds its length from wing-tip, acute at tip, hardly broader than second submarginal cell, latter nearly twice as long below as broad, narrowed one-fourth above, receiving the first recurrent vein near middle; third submarginal cell about twice as long below as the second, narrowed one-fourth above, receiving the second recurrent (curved) before middle, this cell not nearly its length from outer margin; basal vein ends a little before transverse, latter sloping; in hind wings the anal vein ends a little before forking of cubitus.

Length of fore wing 10.5 mm.

One female from Tena, Ecuador, 23 February; type M. C. Z. no. 26775.

Alasagenia corymele spec. nov.

Body black, clypeus and lower face silvery; propodeum with a broad silvery or somewhat yellowish band across base and another across apex, latter almost broken in middle; the coxae and mesosternum somewhat silvery, and faint silvery iridescence on each side of mesonotum near base of wings; antennae ferrugineous to brown, basal joint dark above; mid and hind legs except coxae ferrugineous to black, the front legs blackish on femora, brown on tibiae, and the tarsi pale; sides of abdomen with a faint whitish pubescence; wings hyaline, fore wings with broad brownish yellow stripe on costal half covering first and second discoidal cells, marginal and second submarginal leaving wing-tip and most of third discoidal cell hyaline; all the darker parts with fine blackish hair. Clypeus rather large, broadly, but shallowly concave below. Face scarcely narrowed above; ocelli rather elevated, the hind ones a little nearer each other than to eyes; antennae slender, tapering toward tip, the fourth joint rather thick, second plus third joints not quite equal to vertex width; pronotum scarcely concave behind; propodeum as broad at base as long, finely striate across middle; abdomen strongly petiolate, basal segment longer than broad behind, above somewhat depressed, tip of abdomen above with only very short hair, venter with dense short yellowish to silvery hair; head, thorax, propodeum, mesosternum and pleura with rather dense and moderately long, pale hair, a few hairs on basal segment above.

Legs slender, hind tibiae with a carina broken by a row of short but stout spines, scarcely distinct teeth, inner spur two-fifths of basitarsus. Fore wings with slender marginal cell, about two-thirds its length from wing-tip; second submarginal below twice as long as broad, narrowed almost a third above, receiving the first recurrent at last fourth; third submarginal cell hardly twice as long below as the second, narrowed one-third above, hardly one-third its length from outer margin, receiving the second recurrent (slightly curved) a little before middle, basal vein but slightly sloping, ends a little before the transverse; in hind wings the anal vein ends much beyond the forking of cubitus.

Length of fore wing 15 mm.

One female from Port of Spain, Trinidad, 12 July (Cornell), and others from Blairmont, British Guiana, Sept., Oct., Nov. (F. X. Williams).

What is doubtless the male is very similar, black, covered with sericeous pile; two spots of golden at tip of propodeum and a band of silvery across base, just as in female, the antennae, however, are black, and the legs are darker, but tip of femora and base and tip of tibiae pale rufous. Instead of the yellowish brown of female the costal streak is dark brown and, as in female, occupies all of the first discoidal cell; stigma yellowish, upper edge not three times its width. The head and propodeum with much white hair; abdomen fusiform, with much shorter hair near tip and on venter; lateral ocelli almost as near eyes as to each other; propodeum shows only indistinct striae.

Length of fore wings 12 mm.

From Valle Chanchamayo, Peru, 10 February (Weyrauch). Type at Cornell Univ., paratypes M. C. Z. no. 26768.

Alasagenia cymbele spec. nov.

Male. Black, antennae black, legs testaceous, femora more brown, veins mostly black; wings hyaline, with a broad costal streak, similar to that of *A. corymele* but the black occupies only extreme base and upper margin of first discoidal cell. Clypeus and lower face silvery, dense white hair under and above antennae, less dense on vertex, much white hair on back of head and upon upper part of pronotum, some on scutelli and propodeum, long on posterior part; pleura also white-haired, and a band of white pubescence across base of propodeum and a spot of golden near each posterior corner. Abdomen with whitish pile, especially distinct on last three or four segments,

basal segment with silvery pile and long, erect pale hairs; femora with a whitish bloom. Structure very similar to male of *A. corymele.* Clypeus broad, truncate below; second plus third antennal joints hardly equal vertex-width; lateral ocelli scarcely nearer to each other than to eyes; pronotum only slightly arcuate behind; propodeum punctate, very indistinctly striate in places. Legs slender, hind tarsi compressed, inner spur of hind tibiae not one-half of basitarsus. Wings with venation much as in allied forms, but apical cells hardly as long as usual; the marginal cell more than one-half length from wing-tip; stigma yellow, plainly longer than in *A. corymele,* its costal length over three times its width; second submarginal cell as broad as marginal, lower side not twice its breadth, receiving the first recurrent vein at apical third submarginal cell nearly one and one-half times as long below as second, narrowed one-third above, outer side scarcely curved, receiving the second recurrent a little before middle; in hind wing the anal ends beyond forking of cubitus.

Length of fore wings 10 mm.

One male from Villarica, Paraguay, March (Schade). Type M. C. Z. no. 26676.

Alasagenia erichsoni Banks

Described from Kartabo, British Guiana.

Alasagenia pilifrons Cameron (Priocnemis)

Described from Demerara, specimens from Kamakusa, Bartica, and Rio Essequibo, all in British Guiana.

Lissagenia gen. nov.

This differs from Alasagenia principally in lacking teeth on the hind tibiae, having only small spines or bristles; the pronotum curves to the collar but not as evenly as in Alasagenia, the mesonotum not as much arched as in that genus; the hind tibiae, viewed from behind, are more sinuous, and in none of the three species does the mesosternum project conically as in several of Alasagenia. The body is fully as hairy, the beard is composed of numerous fairly long hairs, sloping but little forward, and scarcely different from other hairs near by. The venation is very similar.

Type, *Lissagenia flavipennis* spec. nov.

Table of species

1. Wings entirely black, iridescent ..... *difformis*
   Wings flavescent 2

2. Fore wings with a brown cloud behind the stigma and second submarginal and part of third discoidal cell ..... *insignis*
   Fore wings without dark marks ..... *flavipennis*

LISSAGENIA FLAVIPENNIS spec. nov.

♀ Body black; antennae yellowish brown, seventh joint pale yellowish; femora black, tibiae and tarsi more reddish brown, spurs dark; fore wings pale yellowish, fading out to hyaline toward tip, hind wings yellowish on costal half, more clear behind, veins and stigma yellowish. Head extremely hairy, clypeus bristly below, but hairy all over, front with shorter hair, longer ones on vertex, much long hair on underside of head and a distinct beard on labium; front coxae with very long hair, shorter on other coxae, some fine hairs on basal part of femora below, pronotum hairy all over, mesonotum with very short erect hairs, longer ones on post-scutellum, propodeum hairy on apical half, pleura and mesosternum densely short haired; some hair on basal abdominal segment above, only short hair at tip of abdomen, much and longer on venter; coxae more or less sericeous.

Clypeus about two and one-half times as broad as long, sides but little sloping, lower margin long, nearly truncate. Face but little narrowed above, frontal groove evident on lower part; ocelli in a small triangle, hind ones much nearer each other than to eyes; antennae long and slender, second plus third joints equal vertex-width. Pronotum short, convexly sloping, behind arcuate; propodeum nearly as broad at base as long, narrowed a little behind, no distinct median groove, from side nearly evenly and slightly convex, posterior slope short, but distinct from basal part. Abdomen broadest near tip of second segment, petiole moderately long. Legs fairly long, mid and hind tibiae with only very short spines, from behind hind tibiae slightly sinuous toward base, inner spur more than one-third of basitarsus.

In fore wings the marginal cell fully two-thirds its length from wing-tip, a little broader than the second submarginal cell, latter a little longer below than broad, narrowed but little above, receiving the first recurrent vein scarcely beyond middle; third submarginal cell two and one-half times as long below as second, narrowed more

than one-third above, outer side slightly curved, receiving the second recurrent vein (scarcely bent at middle) beyond basal third, tip of this cell not half its length from outer margin, and extending much beyond marginal cell; basal vein ends plainly before transverse vein, latter sloping; in hind wings the anal vein ends before forking of cubitus.

Length of fore wings 14 mm.

One female from Colonia Neudorf, Santa Catharina, Brazil, November (Sternitzky coll.). Type M. C. Z. no. 26779.

Lissagenia insignis spec. nov. (Fig. 28)

♂ Body black, antennae and legs black; fore wings yellowish out to a dark brown band which occupies nearly basal half of marginal cell, all of second submarginal cell and basal part of third submarginal, and upper outer part of third discoidal cell; beyond and behind this the membrane is nearly hyaline except a pale brown spot at tip of wings; hind wings yellowish, fading out beyond and behind to hyaline, veins and stigma brown to black. Clypeus and lower face whitish pubescent, coxae slightly so, and a spot each side at tip of propodeum, and less plainly at anterior corners. Clypeus very hairy, especially below, front and vertex with very short hair, and similar erect short hair over thorax, propodeum, basal segment of abdomen, venter, and coxae.

Clypeus is fully three times as broad as long, rather concave on front margin, the lower lateral angles produced downward, and in middle is a trilobed projection, the middle lobe the longest, all covered with hair and bristles; maxillary palpi extremely slender; face narrowed a little above, from in front the vertex rounded above eyes, ocelli even with top of eyes; in a small triangle, laterals fully twice as near each other as to the eyes, frontal groove only noticeable below; antennae slender, but second plus third far from equal to width of vertex; pronotum very short, convexly sloping in front, behind broadly arcuate; mesonotum arched; scutellum and post-scutellum compressed, high and prominent; propodeum broader at base than long, no distinct median groove, from side only slightly convex, near tip very hairy; abdomen much narrower than thorax, basal segment more than twice as long as broad behind, gradually widening from base, middle of third segment the widest; legs not very long, but femora moderately long and somewhat swollen, mid tibiae with few extremely minute spines, on hind tibiae the minute spines are scarcely

visible each side of a median carina, from behind the hind tibiae are slightly sinuous toward base, inner spur a little more than one-third of basitarsus; claws with teeth.

In fore wings the marginal cell is hardly two-thirds its length from wing-tip, pointed at end, about as broad as second submarginal cell; latter fully one and one-half times as long below as broad, only a little narrowed above, receiving the first recurrent vein beyond middle; third submarginal cell fully twice as long below as the second, narrowed nearly one-third above, outer side scarcely curved, receiving the second recurrent vein (slightly curved in middle) plainly before middle, tip of this cell well beyond tip of marginal cell, and not nearly half its length from outer margin, basal vein ends well before transverse, latter oblique; in hind wings anal vein ends a little before forking of cubitus.

Length of fore wings 11 mm.

One male from Colonia Neudorf, St. Catharina, Brazil, November (Sternitzky coll.). Type M. C. Z. no. 26780.

Lissagenia difformis Banks (Priocnemella)

Described from Kamakusa, British Guiana; also from Iquitos San Rogue, Peru, April (Klug coll. Cornell Univ.).

Phanochilus Banks

Mentum with many hairs, curving slightly forward; at least a few lateral spines on under side of last joint of mid and hind tarsi; clypeus extends laterally under eyes, lower margin strongly concave; propodeum with transverse ridges except near base and tip; pronotum shouldered each side; hind tibiae at least not clearly serrate, but often a low carina, broken at regular intervals by minute bristles; the outer tip of front tibia has a distinct projection tipped by a stout spine; mesosternum laterally projecting, sometimes in a cone; venation much as in allied genera, the marginal cell quite long, the basal vein ends a little before the transverse vein.

The male shows above the subgenital plate, two, rather pale plates, broad toward base and middle, quickly sloping to the tip, sometimes acute, these plates may be termed the genital plates.

Table of males

1. In fore wings a dark band behind base of marginal cell, tip also brown; tip of subgenital plate truncate; body with silvery or golden pubescence ..... *gloriosus*
   Only the tip of fore wings dark; tip of subgenital plate not truncate 2
2. Abdomen and most of thorax without golden pubescence, mostly in patches; abdomen above showing bluish or steel blue iridescence, some bluish on thorax; tip of subgenital rounded ..... *fuscomarginatus*
   Abdomen and thorax largely covered with golden pubescence .. 3
3. Tip of subgenital plate comes to an almost acute point; tip of genital plates sharply acute ..... *ornatus*
   Tip of subgenital plate rounded; tip of genital plates not sharply acute ..... *nobilitatus*

PHANOCHILUS NOBILITATUS Sm. (AGENIA) (Figs. 18, 24)

In general much like *gloriosus*, the male golden above, silvery below. Clypeal emargination rather more angulate in middle; second plus third antennal joints about equal vertex-width; propodeum with a rather deep median furrow, the few transverse ridges near the turn are not so evident as in *gloriosus*; hind tibiae without any real carina but the minute yellowish bristles at regular intervals indicate the place; inner spur not quite one-half of basitarsus. In forewings the first recurrent ends plainly beyond middle, and the second (little curved) ends plainly before middle of cell.

The subgenital plate is rounded at tip, the long, fringing hairs are very pale; the genital plates broad and coming almost to a point at tip.

In female the golden is only on parts of head, sides and behind of mesonotum, sides of scutelli, base and tip of propodeum; coxae somewhat silvery, and also on basal half of venter. In fore wing the first recurrent ends plainly beyond middle, the second near middle; propodeum has numerous ridges except close to base and tip; median furrow broad and not very deep. Male and female from Rio Itaya, Amazon, Peru, December (Cornell Univ.) other females from Puerto Bermudez, Rio Pichis, Peru, 12 to 13 July and Chenapow, British Guiana 22 August. (A. M. N. H.)

PHANOCHILUS GLORIOSUS Sm. (AGENIA) (Figs. 19, 23)

A male agrees with the description, and also of that of *aureodecoratus* Cameron. The description of *Salius* (*Priocnemis*) *auratus* Fox and notes on the type show it to be the female of *gloriosus*. The lower margin of clypeus is broadly and rather deeply concave; second plus third antennal joints almost equal vertex width; hind ocelli very much nearer to each other than to eyes; propodeum with strong ridges near the turn, none toward base, nor near tip, a broad, moderately deep median furrow; hind tibia with a low carina, broken at intervals by short bristles, not serrate, inner spur about one-half of basitarsus.

In fore wings first recurrent ends just beyond the middle, second recurrent (a little curved) also ends a trifle beyond middle.

The subgenital plate is truncate at tip, almost a little concave, the long fringing hairs are almost black, as are the short hairs on the general surface; the genital plates have a short, narrowed apical part with rounded tip.

One male from Kartabo, British Guiana, 16 July; *auratus* is from Chapada, Brazil, and *gloriosus* from Para, Brazil.

PHANOCHILUS ORNATUS spec. nov. (Figs. 20, 21)

Body clothed as in male *nobilitatis* and *gloriosus* with dense golden to silvery pubescence, clypeus and lower face mostly silvery; cheeks faintly golden, front, thorax and propodeum above golden, abdomen slightly less golden above, coxae, mesopleura, and venter silvery, wings yellowish, very pale, almost hyaline on apical third, tip of fore wings narrowly bordered with pale brown, veins yellowish; antennae broken beyond third joint.

Structure similar to other species; clypeus broad and almost equal vertex-width; hind ocelli much nearer to each other than to eyes, mesopleura swollen laterally, but not as conical as in allied species; pronotum nearly angulate in middle behind, sides shouldered; propodeum ridged much as in *nobilitatus*; hind tibiae with a carina above, interrupted at intervals much as in *gloriosus*, hardly to be considered serrate; inner spur of hind tibiae a little less than one-half of basitarsus. In fore wings the marginal cell fully as broad as second submarginal, latter rather longer than in allies, first recurrent vein ends just beyond middle; third submarginal cell twice as long below as second cell, but nearly twice as broad at upper tip, which is

one-third less than below second recurrent vein ends near middle; basal vein ends further before transverse vein than in the two allied forms.

Subgenital plate comes nearly to a sharp point at tip, the fringing hairs are pale; tips of genital plates sharply acute.

Length of fore wings 15 mm.

One male from Achinamiza, Rio Huallaga, Peru, 27 August (H. Bassler). Type at Amer. Mus. Nat. Hist.

Phanochilus fuscomarginatus Fox (Salius) (Figs. 22, 27)

Agreeing in general with description; abdomen plainly steel blue, and bluish also showing more or less on thorax; antennae with sixth, seventh, and eighth joints yellowish; clypeus, most of face, hind margin of pronotum, sides of mesonotum, each side of scutelli, propodeum above with appressed pubescence, whitish to faintly golden in some views on propodeum; coxae and venter, upper sides of abdomen silvery; wings bright yellow, but paler before the brown outer margin.

Clypeus of female almost hexagonal, in male shorter and more transverse, in both broadly concave below; and separated a trifle more from mandibles than in other forms; second plus third antennal joints equal vertex-width, latter is proportionally a little more narrow than in other species, ocelli hardly as near eyes as in other species; propodeum with a very broad and shallow median furrow, the numerous ridges not broken in crossing it.

On hind tibia there is a carina, broken at regular intervals and here elevated a bit and with a short, stout, black spine, so tibiae can be said to be faintly serrate; in the male this is more distinct, but still plainly a broken carina.

In the fore wings the marginal cell is about as broad as second submarginal cell, the first recurrent vein ends beyond the middle, the second recurrent (curved) ends at or a little before middle in both sexes.

The male is much smaller than female and rather more slender. The subgenital plate is rounded at tip, the fringing hairs are dark, very long and widely spreading, the hair on venter dense and on last two segments very short; the genital plates are very broad, coming nearly to a point at tip. It was described from Chapada and Santarem, Brazil; specimens studied are from Belem and Jabaty, Para, Brazil, May and June (F. X. Williams).

Subfamily CRYPTOCHILINAE

This subfamily is similar to the Pepsinae in many ways, but readily separated in that the first recurrent vein ends near or beyond the middle of the second submarginal cell. There is no real petiole to the abdomen. The males do not have the hind tarsi compressed; the hind tarsi usually have spines on under side of last joint; in the wings there is no real pocket at base of third discoidal cell.

The claws may be cleft or toothed, and there is usually some hair on under side of the mentum (absent in Pepsinae). Many, but not all, species have a row of teeth on the hind tibiae of the females, and in this sex the second ventral segment has a transverse line or groove or at least an impression. The tips of tibiae usually have short, close-set spines, sometimes very minute.

In size they range from specimens as large as a large Pepsis to specimens as small as a male Pseudagenia. Separating the Pseudageninae by the possession of a true hour-glass shaped petiole attaching abdomen to propodeum, I thereby include in this subfamily some that would have previously (by absence of teeth on hind tibia) been placed in the Pseudageninae, and also one large genus, Priochilus, that has several characters of the Psammocharinae. This genus, however, has no pocket in base of third discoidal cell, and there is a distinct impression on the second ventral segment. Several of the larger Priochilus have the minute spines and spine-pits on the upper side of hind femora, a character which has been used as an indication of the Psammocharinae; however, not all Psammocharinae have these pits; moreover the venation of Priochilus more closely resembles other Cryptochilinae than the Psammocharinae.

Synopsis of genera based on females

1. Claws cleft, no lateral spines to last joint of mid and hind tarsi; basal vein interstitial or nearly so with transverse claws 2
   Claws toothed 5

2. Last joint of mid and hind tarsi with a median row of spines or bristles on under side or antennae slender toward tip, hind tibiae with rather long spines, no teeth or very small, hind femora often with a few spine-pits above near tip; transverse vein only slightly if at all curved ..... *Priochilus*
   No median spines on last joint of mid and hind tarsi; no spine pits on femora 3

3. Hind tibiae without either spines or teeth above; transverse vein of fore wings straight across; third submarginal cell as broad as long ..... *Nannochilus*
   Hind tibiae with teeth or spines above; transverse vein more or less oblique; third submarginal cell usually longer than broad 4

4. Antennae distinctly somewhat clavate; last segment of abdomen compressed; dorsal part of pronotum flat, front part vertical; hind tibiae with spines, no teeth; in hind wings anal vein ends before forking of cubitus ..... *Balboana*
   Antennae not at all clavate; last segment of abdomen not compressed; pronotum rounded toward front; hind tibiae with a row of teeth and also bristles; in hind wings anal vein ends far beyond forking of cubitus ..... *Anacyphonyx*

5. No distinct spines on last joint of hind tarsi, neither lateral nor median 6
   Some spines either lateral or median on last joint of mid and hind tarsi 9

6. Basal vein ends at or very near to transverse vein; at tip of front tibia is a spine much stouter than the others around tip, and it is on upper side and slightly curved; clypeus not especially large ..... *Calicurgus*
   Basal vein ends before the transverse vein; spines at tip of front tibia are mostly of one size, none above much larger than others 7

7. Clypeus never very large, its length not nearly one-half the length of face ..... *Priocnemis*
   Clypeus very large, nearly or quite one-half the length of face 8

8. Clypeus with a tooth or process in middle of the broad front margin, this margin elevated much above the labrum; maxillary palpi very slender ..... *Priocnessus*
   Clypeus with no median tooth or process at middle of front margin; this margin little, if any, raised, but just above the labrum which it obscures ..... *Amerocnemis*

9. No teeth to hind tibiae, if so the last tarsal joint has lateral spines 10
   Hind tibiae with distinct teeth above as well as stout spines .. 11

10. Malar space very long, last joint of hind (and mid) tarsi with distinct lateral spines; front femora very greatly thickened .. *Chirodamus*
    Malar space very short; last joint of mid and hind tarsi without lateral, but with median teeth; front femora only slightly swollen ..... *Reedimia*

11. Transverse vein oblique; propodeum sloping, evenly rounded from base to tip, no distinct tooth or spine in front of mid coxa; no raised areas or humps on second ventral segment. *Calopompilus*
Transverse not oblique; straight across or in a slight recurve.. 12

12. Propodeum at first nearly level, sides (before slope) nearly vertical; transverse vein in a slight recurve; no tooth or spine just in front of mid coxae; no raised area on second ventral segment..... *Adirostes*
Propodeum sloping, and somewhat curved from base to tip, sides rounded; a stout, often slightly curved spine just in front of each mid coxa; second ventral segment with some raised areas, ridges, or humps on the part behind the groove..... *Priocnemioides*

Adirostes gen. nov.

In the Cryptochilinae; mentum hairy, claws with a median tooth; pronotum about as in Priocnemioides, groove on second ventral segment strong; no tooth or spine just in front of mid coxae, and no raised areas on hind part of second ventral segment; the venation generally similar to allies, the transverse vein is not oblique, nor straight across but is curved back a little at each end. The special character is the modification of the propodeum; instead of sloping in a curve toward tip it is nearly level for some distance and the sides are elevated extending back from spiracle to near end as a rounded ridge so that the sides are vertical. It is thus a step to the remarkable development in the Chilean Sphictostethus, but there is no constriction between propodeum and thorax. The type is

Adirostes tolteca spec. nov.

Black; body almost wholly covered with bright golden pubescence; some small spaces each side of scutelli, middle tip of propodeum, the sternum, and venter without the golden. Legs and antennae black; fore wings bright golden, hind wings more yellowish, two large black marks in fore wings, one nearly square occupying much of the second and third submarginal cells, and apical half of third discoidal cell with an extension along cubitus down to wing margin; the other mark is a long black streak over anal area, except near base, with an extension up each side of lower section of basal vein and occupying lower part of second discoidal cell.

Clypeus large, about three times as broad as long, lower margin truncate. Face higher than broad, narrowed about one-fourth above, third antennal joint about equal vertex-width, lateral ocelli very

much nearer each other than to eyes; pronotum angulate behind; head and thorax (including pleura) with scattered rather long and erect hair. Propodeum much longer than broad, from the side the basal part scarcely sloping and only a trifle curved, here with only short hair, behind and on sides with long hair.

Abdomen about as in Priocnemioides, the tip rather blunt, last segment above very hairy, and long hairs on venter. Legs also about as in that genus, rather slender, front femora slightly concave above, and more convex below, with long hairs below, all tibiae with many short black spines and the hind pair with a row of small well separated teeth, inner spur of hind tibiae not one-half of basitarsus.

Fore wings with the marginal cell fully four times as long as broad, pointed at tip, hardly one-half its length from wing-tip, broader than second submarginal cell; latter more than twice as long below as broad, scarcely narrowed above, each end oblique, receiving first recurrent vein plainly beyond middle; third submarginal cell nearly one-half longer than second, narrowed less than one-fourth above, outer vein sloping and nearly evenly curved, receiving second recurrent (curved in middle) at about two-fifths from base; basal vein sloping, little curved, ends much before transverse, latter short and curved back a little at each end. In hind wings the anal vein ends only a little beyond the forking of cubitus, outer cross-vein beyond middle of radial sector.

Length of fore wing 18 mm., of body 23 mm.

One female from Carapata, Rio Tarma, near Palca, Peru, 2500 m., 1–3–43 (Weyrauch coll.). Type M. C. Z. no. 26656.

Priocnemioides Radoszkowski

This was separated from Priocnemis because the third antennal joint was about as short as those beyond, and the hind tibiae were said to have two rows of strong spines above. He included two described species, *Pompilus fulvicornis* Cresson and *P. flammipennis* Smith, and described a new species which he supposed came from Spain.

Later Shulz noted that these species had two raised, somewhat teat-like, areas on the ventral side of the second segment. The length of the third antennal joint is plainly longer in some forms, otherwise similar, and which have very distinct ventral teats. Moreover the second ventral varies in shape of the raised areas, sometimes a broad curved ridge, sometimes two flat areas; but in all these forms there

is a distinct, slightly curved tooth or spine in front of each mid coxa, this is not present in the genotype of Cryptochilus, nor in genotype of Salius, nor do these genera have the modified second ventral segment.

I select *Pompilus fulvicornis* Cresson as the genotype. There are many species in South America. Those seen may be separated by the following key.

Females

1. Wings black or brown, without rufous or yellowish at least on front pair 2
   Wings at least partly rufous or yellowish 9

2. Head and thorax with golden or yellowish hair; tip of fore wings pale ..... *aurifrons*
   Head without golden or yellowish 3

3. Antennae wholly black; body bluish to greenish ..... *carinatus*
   Antennae in part yellowish or rufous 4

4. Antennae yellowish from base of second joint out; humps on second ventral segment connected by a curved ridge; fore wings not pale at tip ..... *peruvianus*
   Antennae yellowish from tip of third joint or further out 5

5. Tip of fore wings distinctly paler 6
   Tip of fore wings not paler 8

6. Hind wings partly pale in middle, front wings brownish not deep black; last joint of antennae black ..... *brasiliensis*
   Hind wings evenly black as the front pair 7

7. Third joint of antennae fully equal to face at base; propodeum (from side) nearly evenly convex; second ventral segment with elevated teat-like swellings; last one or two antennal joints dark ..... *mammillatus*
   Third joint of antennae not equal width of face at base; propodeum (from side) with distinctly separated basal part and posterior slope; second ventral with only slight rounded raised areas; head usually greenish iridescent; last antennal joint dark on extreme tip ..... *praestans*

8. Tubercles of second ventral high and surface between scarcely punctate; fourth antennal joint yellowish, last joint black; clypeus evenly slightly concave below ..... *bituberculatus*
   Tubercles lower and surface between coarsely punctate as is also the other segments in middle; fourth antennal joint mostly dark, last joint brown; clypeus below angulately emarginate in middle ..... *persimilis*

9. Antennae black; last ventral segment with a median ridge; tubercles of second ventral segment connected by a curved ridge; fore wings broadly bordered with dark (if not worn); in hind wing anal ends much beyond fork ..... *coeruleus*
Antennae more or less rufous or yellowish; last ventral segment without median ridge 10

10. Head, thorax, and base of abdomen with yellowish to golden hair; fore wings nearly hyaline at tip, very large species ..... *gigas*
No yellowish nor golden hair on body 11

11. Tips of wings pale, nearly white, contrasting against adjoining brown, which is much broader than pale apex 12
Tips of fore wings if pale not with adjoining brown or but narrow, yellowish or rufous 13

12. Fore wings plainly brownish, except pale tips; hind wings yellowish; last joint of antennae black ..... *brasiliensis*
Fore wings ferrugineous in middle, darker beyond before the hyaline white tip; base rather broadly black ..... *purpureipes* var.

13. Base of wings black about one-half way out to the basal vein 14
Base of wings little if at all black 17

14. No tubercles on second ventral segment, but surface is very slightly transversely raised; tip of fore wing dark, extreme base dark ..... *iheringi*
Tubercles, swollen areas, or curved ridges on second ventral segment distinct 15

15. Hind wings almost wholly dark, fore wings with very little rufous or ferruginous, largely dark; inner spur of hind tibiae one-third of basitarsus ..... *tenebrosus*
Hind wings plainly partly rufous or yellowish 16

16. Third joint of antennae dark, black of wing-base sharply defined, rest of wing yellowish, but tip pale; clypeus very large, lateral ocelli nearly twice as far from eyes as from each other ..... *purpureipes*
Third joint of antennae mostly rufous; tip of wings dark; ventral tubercles extended longitudinally; lateral ocelli not nearly twice as far from eyes as from each other ..... *urichi*

17. Second ventral segment without distinct tubercles or curved ridge; third antennal joint dark at base; tip of fore wings plainly dark ..... *iheringi*
Second ventral segment with more or less distinct tubercles or raised areas 18

18. More or less dark at base or at tip of wings 19
No distinct dark at base nor at tip of wings 23

19. Third and fourth joints of antennae wholly black, wings narrowly black at base and broadly brown at tip ..... *velutinus*
Fourth antennal joint pale, third partly pale 20

20. Size large, fore wings 30 mm.; narrowly dark at base, not at tip of wings; third antennal joint much longer than vertex width ..... *grandis*
Size much smaller; usually darker at tip of wings; third joint of antennae little, if any, longer than vertex-width 21

21. Clypeus (from side) most elevated near upper edge; fore wings only faintly fumose; inner spur of hind tibia more than one-third of basitarsus ..... *molestus*
Clypeus (from side) most elevated near or at middle; inner spur of hind tibia not more than one-third of basitarsus 22

22. Wings plainly yellowish, with darker at tip; posterior slope of propodeum hardly well-separated from basal part, and posterior slope not steep ..... *bonariensis*
Wings not so yellowish, but suffused with dark; posterior slope of propodeum well-separated from basal part, and sloping steeply to tip ..... *luteicornis*

23. Clypeus below broadly evenly concave; third antennal joint and often fourth dark ..... *perpunctatus*
Clypeus below deeply emarginate in the middle part only ..... *nitidus*

Synopsis of males

1. Pronotum elongate, flat above, front part vertical; wings yellowish to rufous, tip faintly dark ..... *molestus*
Pronotum short as usual, rounded gradually forward to collar 2

2. Head and thorax with golden pubescence 3
No golden pubescence 4

3. Wings black or dark brown, with a reddish iridescence; antennae black on first four joints ..... *aurifrons*
Wings yellowish to rufous, antennae mostly yellowish; very large species ..... *gigas*

4. Wings black 5
Wings yellowish to rufous or brownish, not evenly black 9

5. Antennae wholly black; subgenital plate with a broad median raised area, with long lateral fringes ..... *carinatus*
Antennae about half or more rufous 6

6. Antennae rufous from second joint out; subgenital plate with an elongate elevated part in middle; wings wholly black ..... *peruvianus*
Antennae dark on third joint 7

7. Wings not pale at tip; body broad, much like female; subgenital plate without dense marginal fringe ..... *bituberculatus*
Wings plainly a little paler on tip 8

8. Body slender; subgenital plate with a median carina; surface with dense erect nearly evenly short hair, no long dense fringe of hairs on sides ..... *mammillatus*
Body about as in female; a dense fringe of long incurving hairs on margin of subgenital plate; clypeus deeply incised in middle ..... *praestans*

9. Antennae wholly black, the subgenital plate has a median elongate area with a rounded tip ..... *coeruleus*
Antennae largely rufous or yellowish 10

10. Tip of wings pale to white hyaline in contrast to adjoining dark surface 11
If tip is pale it is not next to a dark surface, but to rufous or yellowish 12

11. Fore wings rather evenly brownish except pale tip ..... *tinctipennis*
Fore wings broadly rufous in middle, almost white at tip .... *purpureipes*

12. Hind wings almost wholly dark, scarcely a trace of yellowish; inner spur of hind tibia more than one-third of basitarsus .... *tenebrosus*
Hind wings plainly partly yellowish; inner spur of hind tibia not more than one-third of basitarsus ..... *bonariensis*

Priocnemioides molestus spec. nov.

Body black, more or less bluish in certain views; antennae from base of third joint out rufous, extreme tip of last joint dark. Wings black for a short distance, beyond ferrugineous, with a fumose tip, in hind wings fumose along the hind border.

Body slender as in males of *mammillatus*; clypeus is abruptly elevated at base, and the upper part concave each side; when antennae are depressed the basal joint rests in this concavity; from side to side the clypeus is strongly convex, surface with a few punctures and bristles, lower edge nearly straight; face plainly higher than broad, only a little narrowed above, with some long hairs; lateral ocelli much nearer to each other than to eyes; second plus third antennal joints not nearly equal to vertex-width. Pronotum vertical in front, nearly flat above, arcuate behind, in length nearly equal the scutellum plus postscutellum, surface with some erect hairs; pleura hairy. Propodeum much longer than broad, from side sloping, but only very slightly convex, sides parallel, erect hair on posterior part and

on sides in front. Legs slender, hind tibiae with a row of short stout spines above and an outer row of shorter, more separated spines, inner spur about two-fifths of basitarsus. Abdomen slender, with nearly parallel sides, a few hairs near tip, more below; second ventral segment shows no definite swelling; subgenital plate broad, almost truncate across tip, sides with a few out-curved bristles, surface punctate, with a low median ridge on anterior part, preceding segment with dense, extremely short erect hair over middle, but on sides a row of longer erect bristles. In fore wings venation much as in *bonariensis*, but the marginal cell is not quite as pointed at tip.

Length of fore wings male 10 to 15 mm.

From Huanco, Peru, 1800 m., 6 April, Limon, Peru, 1500 m., and Lima, Peru, 1 January, four males from Dr. Weyrauch.

Type M. C. Z. no. 26659.

The form which I believe must certainly be the female, is about same size and appearance; the clypeus from side view is plainly more abruptly elevated than usual and similar to the females of the allied Cuban *P. ignipennis*. Otherwise in color and structure much like a small *bonariensis*, the inner spur of hind tibia is more than one-third of basitarsus, in *bonariensis* hardly one-third; second plus third joints of antennae about equal vertex-width; propodeum very finely striate.

Length of fore wings 10 mm.

One from Lima, Peru, 2 May (Cornell Univ. Exped.). The allied *P. ignipennis* has the basal antennal joints yellowish but the structure is very similar in both sexes, but the Cuban species is variable in size of clypeus and size of ventral tubercles.

Priocnemioides aurifrons spec. nov.

Black, clypeus and face densely covered with golden pubescence, also, but scarcely as bright, on pleura, coxae, middle of mesonotum, scutellum, metanotum, and over entire propodeum, less distinctly on upper side of basal segment of abdomen. Wings dark brown with a reddish iridescence, a little darker than in *tinctipennis*, tip narrowly pale; antennae black to end of fourth joint, upper side of fifth and partially on sixth, beyond rufous to yellowish, but last three joints brown.

Structure much like other species; clypeus rather deeply emarginate below; ocelli in low triangle, hind ocelli almost twice as near each other as to the eyes; vertex-width almost equal to third antennal

joint, latter longer than fourth; propodeum coarsely ridged in posterior part, more coarsely than in *mammillatus* or *bituberculatus*; second ventral segment with a narrow raised area each side behind; subgenital plate about as broad as in *mammillatus*, with short dense erect hair, and also on the preceding segment, but others with only scattered long hairs.

Front femora with some short, fine hairs above; hind tibiae with rows of short spines much as other species, but those above very numerous and fine; inner spur of hind tibia about one-third of basitarsus, latter with a longer and denser fringe than in other dark-winged species.

Venation about as usual; the first recurrent vein, however, ends further from tip of second submarginal cell than usual, the second recurrent angulate near middle, ending much before middle of third submarginal cell, the latter much longer than the second; in hind wings the anal vein ends just beyond the forking of cubitus.

Length of fore wing 20 mm.

One male from Démerara River, British Guiana, 20 March (Cornell).

Priocnemioides gigas Fabricius (Pompilus)

I believe that the *Priocnemis croesus* Smith is a synonym.

From Santa Cruz, Bolivia (Steinbach); Kartabo, British Guiana, 5 March (Beebe); July-August (Wheeler); Bartica, 11 February (Cornell coll.); Chenapoum to Saveritek, British Guiana (Amer. Mus. Nat. Hist.).

The yellowish wings are pale at tip; the antennae dark out to middle of third joint; clypeus broadly, slightly concave below; the ventral tubercles widely separated. Marginal cell more than one-half its length from tip of wing, broadest along top of third submarginal; second submarginal rhomboidal, hardly twice as long below as broad, scarcely narrowed above, first recurrent ends one-fourth from tip of cell; third submarginal cell usually fully as long below as second, above about one-half as long as below, outer side nearly evenly curved, second recurrent (strongly bent above middle) usually ends before middle; in hind wings anal vein ends at forking of cubitus; hind tibiae have many (15 to 18) low teeth; those near tip very small, the bristles much higher, below is a row of short, even bristles.

PRIOCNEMIOIDES PURPUREIPES Cameron (PRIOCNEMIS)

From Kalacoon, Bartica, and Georgetown, 10 to 15 November; Blairmont, September, all British Guiana; and northwest part of Trinidad where it appears to be quite common.

This species varies in the depth of its colors, in some cases the brown near tip is so dark that it would almost seem to be another species, those from Trinidad are especially dark.

The clypeus is only slightly concave below, almost angulate in middle; spines on hind tibiae are blunt. Marginal cell long, but more than one-half its length from tip of wing; second submarginal cell one and one-half to twice as long below as broad, narrowed a little above, both ends oblique, first recurrent ends near end of cell; third usually a little longer below than second, but above about equal to second, outer side curved to almost bent, second recurrent vein (strongly bent to angled) ends before middle of cell; in hind wings the anal (as usual) ends near forking of cubitus.

The male is similar to the female, but smaller; the dark band near tip of fore wing is narrower, the pale tip fully as broad as in female. Clypeus rather strongly and acutely indented in middle; venation similar; the broad and broadly rounded subgenital plate is granulate, no smooth areas, densely hairy on surface, and with curved bristles on margin.

PRIOCNEMIOIDES GRANDIS spec. nov.

Closely related to *P. gigas* Fabr. (*croesus* Sm.), but the black body has no golden (nor silvery) pubescence whatever; antennae yellowish-rufous from before middle of third joint; wings mostly rufo-ferruginous, more rufous than *gigas*, base plainly black for about one-fourth way out to basal vein, tip of fore wings plainly pale as in *gigas*.

Clypeus only slightly emarginate in middle of lower margin; vertex broader than in *gigas* so that the hind ocelli are almost twice as far from eyes as from each other; second ventral segment with a low, but distinct elevation each side; hind tibiae with many teeth above, each one with a sloping basal side and much shorter apical side (quite different from *gigas*); inner spur of hind tibiae hardly one-third of basitarsus. Second plus third antennal joints much longer than vertex-width; scutellum more elevated than *gigas* and with erect hairs above; propodeum moderately ridged; second ventral segment elevated each side and with a short ridge, and connected behind by a broad low, curved ridge, the area with large scattered punctures.

In fore wings the marginal cell is broadest beyond middle, rather blunt-pointed at tip, not nearly as broad as the second submarginal cell, latter about one and one-half times as long below as broad, both ends sloping, but basal the more, first recurrent vein ends just before tip of cell; third submarginal cell only a little longer below than the second, the third abscissa much shorter than second, outer side of cell broadly, evenly curved, second recurrent vein (angulate above middle) ends before middle of cell; in hind wings the anal vein ends at the forking of cubitus.

Length of fore wings 29 to 30 mm.

Two females from Colombia, probably Bogota, (Felipe Ovalle). Type in Amer. Mus. Nat. Hist., paratype M. C. Z. no. 26870.

Priocnemioides nitidus spec. nov.

Very similar to *P. perpunctatus*, the wings, however, are darker, not yellowish, but an obscure ferruginous; the black on antennae extends only onto the basal third of third joint, beyond rufous; the abdomen is more polished and shining than in *perpunctatus*.

Clypeus heavily punctured below and with many long bristles, but the lower margin is deeply emarginate in the middle portion only (broadly arcuate in *perpunctatus*); the face is more narrow above, with long hairs, and lower front somewhat roughened or punctate; third antennal joint much longer than vertex-width; lateral ocelli much nearer each other than to eyes; pronotum angulate behind, hairy above; mesonotum with the median carina on hind part as in *perpunctatus*, a few long hairs each side; scutellum scarcely elevated.

Propodeum hairy above, more coarsely ridged and the ridges more separated than in *perpunctatus*. Abdomen similar, with two fairly sharp tubercles on second ventral segment. Legs also similar, very slender; all tarsi very spiny; teeth on hind tibiae large and prominent, inner spur one-third of basitarsus. Wings with venation very similar to *perpunctatus* but both submarginal cells a little shorter; the second recurrent vein with the strong bend near upper end as in that species.

Length of fore wings 21 mm.

Two females, one (holotype) from Hacienda Ila, Rio Anzu, Oriente, Ecuador, 650 m. (W. C. McIntyre), and one Valle Chanchamayo, Peru, 800 mi., 1 April (Dr. Weyrauch). Type M. C. Z. no. 26662.

PRIOCNEMIOIDES PERPUNCTATUS FOX (MYGNIMIA)

From Buenavista, near Santa Cruz, Bolivia (Steinbach). Cornell Univ., and Mus. Comp. Zool.; Kartabo, British Guiana (W. M. Wheeler).

I think it probable that this is the *Calicurgus flavipennis* Lepeletier described from Cayenne.

PRIOCNEMIOIDES COERULEUS Taschenb. (PRIOCNEMIS)

Specimens from Santa Cruz, Bolivia (Steinbach); Villa Rica, Paraguay, December, January (Schade coll.); Tacuru-Pucu, Paraguay, (Donald Wees); La Rioja, Argentina (Giacomelli coll.) Cornell Univ.; San Juancito, Argentina 27 February (Cornell Univ. Exped.). Tintina, Santiago Estero, Argentina, 21 February (Cornell Univ. Exped.). *Salius gracilicornis* Brèthes may be the male of *coeruleus*. In the hind wings the anal vein ends much further beyond the forking of the cubitus than in other species.

The male has a fairly large body; clypeus only a little more emarginate in middle than in female; subgenital plate broad, rounded, fringed with long out-curving bristles, in middle an elongate elevated area, broadly rounded at tip, surface punctate; preceding segment with a median carina and laterally a higher carina bordered by several rows of long, erect bristles. Second ventral segment with an elevated, curved area, broad at each end and leaving a triangular area behind.

PRIOCNEMIOIDES BRASILIENSIS Taschb. (PRIOCNEMIS)

From Maracaju, Matto Grosso, April-May (Fairchild). Villa Rica, Paraguay, January (Schade coll.) Cornell Univ.; Campinas, Sao Paulo, Brazil, February (Williams).

PRIOCNEMIOIDES TINCTIPENNIS FOX (PRIOCNEMIS)

From Maracaju, Matto Grosso, April-May (Fairchild); Villa Rica, Paraguay, January (Schade) Cornell Univ., and Tacuru-Pucu, Paraguay 2 to 3 April (Donald Wees). I think there is no doubt that *tinctipennis* is the male of *brasiliensis*.

The subgenital plate is broad, with few marginal curved hairs, surface finely striate, with median carina not reaching tip, and with rather dense, erect short hair; preceding segment with the broad middle area covered with erect short hair like that on the subgenital

plate; the clypeus is angularly emarginate in the middle as in *mammillatus*.

Priocnemioides peruvianus Rohwer

Two from Villa Rica, Paraguay, May, and one from Santa Cruz, Bolivia (J. Steinbach).

The clypeus is not as long as the space from anterior ocellus to base of antennae, but is almost as long, the lower edge only slightly concave, the surface is strongly convex in both directions, a few hairs on upper part; the front has hairs in middle fully as long as in *bonariensis*; the pronotum has much long hair above; the propodeum is hairy above and on sides, the striae are fine and quite even, from the side the upper edge makes an even curve, not as high at turn as in *bonariensis*, and the posterior slope not as steep; the venation about as in *bonariensis*. The face is somewhat narrowed at vertex; second plus third joint as long as vertex width; propodeum coarsely striate above and on posterior sides, finely striate in middle of posterior slope.

The male is colored as in female, the antennae yellowish beyond first joint, the vertex is broader than in *mammillatus*, and the second plus third joint not equal vertex-width. The subgenital plate is broadly rounded, the margin with a fringe of out-curved bristles, hardly as dense or as long as in *praestans*, surface with extremely minute hair except in middle where there is a flat, smooth club-shaped raised part, the clavate part not reaching tip, and somewhat depressed in middle. The preceding segment has only a small patch of short erect hair with a few longer ones on sides.

Length of fore wings 15 mm.

A male from Valle Chanchamayo, Peru, 800 m. 1 March (Weyrauch coll.).

Priocnemioides mammillatus Fox (Mygnimia)

Many specimens from Santa Cruz, Bolivia (Steinbach); Mendez, Brazil, Thayer Exped.; Rio de Janeiro, Brazil, Thayer Exped.; Buena Vista, Paraguay, 20 February (Donald Wees); Valle Chanchamayo, Peru, 1 April (Weyrauch) and El Campamiento, Peru, 4 to 9 June (Cornell Univ.).

The male is much smaller and more slender than the female, antennae and wings same color; clypeus only a little more deeply angulate in middle below than in female. Propodeum slender, tapering behind, posterior slope only one-half the length of basal part, coarsely

ridged. The subgenital plate is rounded on sides, minutely striate with a fine median line or carina reaching almost to the tip, surface with dense, erect and nearly evenly short hair, and the curved hairs on margin scarcely any longer, preceding segment with a mass of short, erect black hair.

Length of fore wings of male 18 mm.

Priocnemioides carinatus Fox (Mygnimia)

Fox has identified the *Pallosoma carinata* Lepel. as this species, and the only objection I see to it is that nothing is said about blue on body; the various specimens I have seen have at least some blue, and usually largely so. Lepeletier's description of his *Calicurgus cyaneus* p. 405, fits much better, but until types can be examined I leave it.

Specimens are from Buenavista near Santa Cruz, Bolivia (Steinbach) Cornell Univ.; Chapada, Brazil, (H. H. Smith). Rio de Janeiro, Brazil (Thayer Exped.); Maracajú, Matto Grosso, April-May (Fairchild); Villa Rica, Paraguay, January (Schade coll.) Cornell Univ.; and Tacuru-Pucu, Paraguay, 2 to 7 April (Donald Wees); Campinas, Brazil (Williams).

The male has a broad body, but is usually smaller than the female; subgenital plate broad, nearly truncate across tip, fringed with long curved hairs, in the middle with a large elevated area, somewhat rectangular, not quite reaching tip, and slightly narrowed at base; it is bare but with fine punctures, and each side falls off steeply to the general surface; the preceding segment is densely punctate, margined on each side with a ridge and just outside of the ridge are dense rows of long black hair.

Priocnemioides iheringi Fox (Salius, Priocnemis)

A female from Sao Paulo, Brazil (Cornell Univ.); a female from Guayaquil, Ecuador (Amer. Mus. Nat. Hist.) may belong here.. It agrees in lacking any definite swollen areas on second ventral segment, but wings not with as much black as the other specimen.

Priocnemioides urichi Banks

Described from Trinidad; also from Mt. Roraima, Brazil, 4200 ft., 29 December (Tate coll., Amer. Mus. Nat. Hist.), and Colombia, probably Bogota.

Priocnemioides velutinus Taschenberg (Priocnemis)

One female from Villarica, Paraguay, February (Cornell coll.). The wings are black at base, but only very narrowly so, the tip quite broadly brown, fading basally into the yellowish; antennae black on first five and part of sixth joints, beyond pale rufous to just before last joint which is nearly black.

Clypeus, from side, elevated on upper part, each side of base of clypeus is a deeper and longer groove than usual, and above it is a broad, but shallow, concavity; second plus third antennal joints equal vertex-width; scutellum well elevated; propodeum with a broad median furrow on basal part, and here hardly any striae and these weak, posterior part finely striate, much more finely than in *P. purpureipes*; hind tibiae spined as usual, inner spur about one-third of basitarsus; venation much as in *purpureipes* and *perpunctatus*, but basal vein ends only a little before transverse.

Priocnemioides bituberculatus Guerin (Pompilus)

Specimens from Rio de Janeiro, Brazil (H. H. Smith); State of Sao Paulo (Hammar coll.) Cornell Univ.; and Kamakusa, British Guiana (H. Lang coll.), also Belem and Jabaty, Para, Brazil, May, June (F. X. Williams); Achinamiza, Peru, 28 September (H. Bassler) (Amer. Mus. Nat. Hist.). *Salius tuberculiventris* Cameron from Demerara is probably a synonym of this species.

The male has a large broad body like female, the third antennal joint is dark, three joints near tip are dark; clypeus broadly angulately emarginate below. The subgenital plate is very broadly rounded, the marginal fringe of rather short hairs, surface striate and covered with short, erect black hair, the middle part is slightly swollen, but no carina.

Priocnemioides persimilis spec. nov.

Female. Black; head, thorax and abdomen with a blue sheen; antennae with first three joints and part of fourth black, beyond yellowish; wings nearly evenly blackish, shining, veins darker.

Clypeus large, nearly as long in middle as space from anterior ocellus to base of antennae, lower margin broadly concave below, but somewhat angulate in middle, hairy on only lower two-thirds;

face scarcely narrowed above, much broader than high; ocelli in a close triangle, laterals more than twice as far from eyes as from each other; front moderately hairy, mostly on sides; vertex-width not as long as third antennal joint; pronotum angulate behind, with some hairs above, not on side-lobes.

Propodeum sparsely hairy above, with fine well-separated ridges, fewer near tip of posterior slope; basal segment of abdomen rather slender, with a median groove on basal part; tip with black hairs, not very long, and beneath with reddish to coppery scales; ventral segments coarsely punctate on posterior part, last almost wholly so, and each segment with some long hairs; second segment with a polished elongate ridge each side, almost a tooth, the two well separated and no basal connecting ridge. Front coxae very hairy, others very slightly, femora very slender, hind tibia above with a row of small well-separated teeth, the spines much higher, inner spur not one-third of basitarsus, outer spur nearly as long.

In fore wing the marginal cell is very long, widest at middle, but not as wide as the second submarginal cell, latter more than twice as long below as broad, base very oblique, receiving the first recurrent vein about one-fifth before tip; third submarginal cell much longer and larger than the second, base oblique, apex evenly curved and oblique, receiving the second recurrent (bent above middle) near basal third, appendix two-thirds way to margin; in hind wings the anal ends considerably beyond fork.

Length of fore wing 23 mm.

One female from Sousa, Para, Brazil, 16 Sept. (Cornell Univ. collection).

Priocnemioides bonariensis Lepel. (Pepsis)

Lucas in his Revision of Pepsis used this name for a species of Pepsis, and gave records from northern South America and Honduras. Brèthes claims there is no Pepsis with yellowish wings and yellowish antennae near Buenos Aires, and applies the name to a common "Salius" that will agree with description; this species has been considered by some as the Chilean *Salius dumosus*. The latter has a slightly shorter third antennal joint, and the propodeum has a much steeper posterior slope, nearly forty-five degrees, while *bonariensis* has a slope scarcely more than thirty degrees, and is usually somewhat convex (seen from side).

In the male of *bonariensis* the subgenital plate is broad, almost

truncate across tip, sides with a few out-curving bristles, in middle an elongate clavate area with a median depression in the clavate apical part, the sides with transverse ridges, preceding segment with erect short black hair, and laterally with some longer bristles.

Bonariensis is common in Argentina; specimens are from Cosquin, Sierra de Cordoba, 1 to 9 March (Cornell Exped.); Chacras de Coria, 21 January (Joergensen); San Juan, 16 to 22 January (Joergensen); Mendoza, 6 December (Joergensen), and San Ignacio, 23 March (Joergensen). Also from Villa Rica, Paraguay, April (Schade coll.) Cornell Univ., and Nova Teutonia, Santa Catharina, Brazil, 16 February (F. Plaumann); Buenos Aires, Argentina, 26 June (Akhurst, Amer. Mus. Nat. Hist.).

Brèthes puts *bonariensis* as a synonym of *Pompilus ferrugineipennis* Haliday (1836) described from Cape Gregory, Straits of Magellan. The short description by Haliday will fit *bonariensis* and also *dumosus*. I doubt if *bonariensis* extends to southern Patagonia.

Priocnemioides luteicornis Lepeletier

The description of *Calicurgus luteicornis* Lepel. fits very well to *bonariensis* except the "ferrugineo-fuscae" of the wings; it was from Minas Geraes of Brazil. Two specimens, one from Maldonado, Brazil (coll. Carey) Thayer Expedition, and one Sao Paulo, Brazil (Cornell Univ. coll.) have the wings plainly darker than in the usual *bonariensis* of Argentine; the dark of base goes a little further out, especially in hind wings, and less contrast between the dark tip and the general surface. They have the somewhat silvery mark each side on lower face and spreading down over clypeus in certain views. The clypeus, ventral tubercles, venation, ocelli are as in *bonariensis*; the propodeum, however, is more plainly divided into basal part and posterior slope, the latter is more steeply sloping than in *bonariensis*, more like *dumosus*.

Length of fore wings 20 mm.

Priocnemioides tenebrosus spec. nov.

Black, antennae yellowish beyond second or base of third joint; fore wings blackish on base, fading into the ferrugineous of middle, outer and hind margin fumose; hind practically without any yellowish, black on base gradually fading to the fumose; venation mostly yellowish.

Clypeus arcuately emarginate on middle below, face as broad below as high, little narrowed above, lateral ocelli a little nearer each other than to eyes; second plus third antennal joints not equal vertex-width.

Pronotum angulate behind; propodeum, from side, nearly evenly rounded above, rather strongly ridged; abdomen very hairy toward tip, even a few on third segment above, venter with long hairs. Legs about as in *bonariensis*, teeth on hind tibiae about as large, the inner spur of hind tibia, however, is more than one-third of basitarsus, in *bonariensis* not one-third of basitarsus. Venation as in *bonariensis*.

Length of fore wings female 13 to 15 mm.

From Maracaju, Matto Grosso, Brazil, April-May (G. Fairchild), two old specimens simply Brasil, and one Lassance, Minas Geraes, Brazil, 9 to 19 November (Cornell Univ. Exped.). Type M. C. Z. no. 26660.

The male, apparently belonging to this species, has the wings as in female, the hind wings fully as dark; flagellum of antennae yellowish. Clypeus a little more deeply emarginate below than in female; the inner spur of hind tibia is also proportionally longer than in *bonariensis*; propodeum rather finely striate all over.

The subgenital plate is on plan of *bonariensis* with a few fringing out-curved hairs on sides, and in middle an elevated clavate area, the tip rounded, but the sides not so plainly ridged; second ventral segment shows only a trace of the humps in the female.

Length of fore wings male 7 mm.

From Villa Rica, Paraguay (F. Shade).

The two Chilean species of Priocnemioides can be separated as follows:

P. dumosus Spin. is very similar to *bonariensis* but the posterior slope of propodeum is noticeably much steeper and the third antennal joint a little shorter.

P. chilensis Guer. has black antennae and yellowish wings, so would run to *coeruleus*; the wings are mostly yellowish and without the dark base and only a narrow terminal border (in *coeruleus* very broad and the middle of wing reddish). There is no median carina on the last ventral segment of female, a point which is found only in *coeruleus*.

Several species described in Salius probably belong to this genus, but I have not been able to identify them; *Salius carinatellus* Brèthes, *Salius andinus* Brèthes, *Salius joergenseni* Brèthes.

Reedimia gen. nov.

In general appearance and structure much like some Calopompilus; claws toothed; no spine in front of mid coxae, transverse vein a little oblique; labrum largely exposed, clypeus short and broad; antennae fairly stout; front femora more enlarged than in Calopompilus, but not nearly as much as in Chirodamus; the last joint of mid and hind tarsus is not flattened below, but rather elevated in middle and the spines are grouped along the middle part only, one in front, but two or three broad near tip, no spines really lateral; the mid and hind tibiae have no teeth above but many small spines mostly in rows, one row above, many on outer side; these spines not nearly as stout as in Calopompilus. No definite malar space or very short.

Type *Agenia hirsutula* Spinola.

Several species occur in Chile, *flavipes*, *xanthopus*, and *armatus*, not especially hairy, and *hirsutula* densely pilose.

Reedimia infernalis spec. nov.

Female. Head, thorax, and abdomen deep black, antennae, palpi, coxae, and femora black, the extreme tip of femora and rest of legs pale yellowish, wings dark brown, not as dark as in *hirsutula*.

Structure very similar to *hirsutula*; the body is fully as densely black-haired as in that species, only dorsum of second, third, and fourth segments mostly bare, all femora with long hair; the mid and hind tibiae have short spines above and on outer side, more numerous and longer than in *hirsutula*; the abdomen is high at base, being nearly vertical in front. The venation is similar; the third abscissa of radius nearly twice as long as fourth, the third submarginal cell not as long as in allied species.

The male is similar to male of *hirsutula*, but not as deep black, the lateral pieces of genitalia are more slender and acute at tip, the subgenital plate also more slender.

Length of fore wing, female 13 mm., male 9 to 10 mm.

A female and several males from South Patagonia (B. Brown); type at Amer. Mus. Nat. Hist., paratypes there and at M. C. Z.

A note on the folded label reads "near fresh water pool on beach below Barancana sea level, Montes Casa, 7 miles south of Rio Coyley. 2/4/1900."

Chirodamus Haliday

This is a true Cryptochilinid; there is a distinct ventral groove on second segment; the propodeum is rather high and short; the hind tibiae have two rows of spines, and some scattered on outer side; the ends of tibiae have the row of short, close-set spines, the claws are toothed; the front leg, however, is very distinctive, the femora more thickened than in Euplaniceps, the tibia also somewhat thickened and lightly curved. The head is peculiar; the eyes are long and narrow, leaving a malar space nearly as long as width of an eye. The antennae set fairly well up above clypeus, latter broad, labrum projecting, rounded below, the head is thin, the mandibles long and little curved, no real tooth on inner side, a few erect hairs on outer side toward base; lateral spines to last tarsal joint.

Chirodamus kingii Haliday

There is a female in the Amer. Museum Natural History from southern Patagonia. It is almost wholly black and extremely hairy; the antennae and front tibiae and tarsi yellowish. In the fore wings the marginal cell is very long, acute at tip, not one-half its length from tip of wing, the stigma moderately large, the oblique tip only in the cell; the second submarginal is about as broad as marginal, fully twice as long as broad, the first recurrent ends beyond middle, third submarginal about one-fourth longer below than second, outer side strongly sloping and then bent, so upper side is little more than one-half of lower, second recurrent ends a little before middle; basal vein ends a little before transverse, latter straight across, not sloping.

The ocelli in a broad triangle, hind ones nearer to eyes than to each other; pronotum not very long above, angulate behind; propodeum short, basal part not as long as scutellum, a median groove, posterior slope broad, a little concave.

Calopompilus Ashmead

The South American species placed here agree in general with Calopompilus, but most of them are smaller, *C. vinicolor* is more typical.

Synopsis of species

1. Males; head and basal antennal joint densely hairy 2
   Females 5
2. Wings pale yellowish to hyaline 3
   Wings dark, almost black 4

3. Antennae black; wings yellowish, dark toward tip; front legs wholly black; rather large species ..... *fidanzae*
   Antennae rufous, front tibiae and tarsi also rufous; wings hyaline or almost so; small species ..... *parvulus*
4. Antennae black, femora and tibiae black ..... *erebus*
   Antennae mostly rufous, but dark toward tips ..... *helas*
5. Antennae black; wings pale yellowish; femora and tibiae with some long hairs; propodeum and basal segment of abdomen densely long-haired ..... *fidanzae*
   Antennae rufous, at least toward tips 6
6. Wings faintly yellowish to hyaline, some veins in fore wings yellowish 7
   Wings plainly dark to almost black, veins brown to black 8
7. Face plainly narrowed above, so vertex width about as long as second plus third antennal joints; lateral ocelli nearer eyes than to each other; second recurrent ends near basal third ..... *vitreus*
   Face not narrowed above, so vertex width is longer than second plus third antennal joints; lateral ocelli a little nearer each other than to eyes; second recurrent ends near middle ..... *relativus*
8. Part of first and all of second antennal joint yellowish, tip not black, flagellum yellowish 9
   First and second antennal joints and several near tip black .... *edmondii*
9. Propodeum coarsely ridged above, large species ..... *vinicolor*
   Propodeum finely, if at all, ridged above 10
10. Posterior slope of propodeum ridged; third plus fourth antennal joint fully equal vertex-width, clypeus and head less hairy ..... *helas*
    Posterior slope of propodeum not ridged; third plus fourth antennal joint not quite equal vertex width; clypeus and head more hairy ..... *fraternus*

Calopompilus vinicolor Pack. (Pompilus)

The *Pompilus vinicolor* Packard goes in Calopompilus; the head and right wings are missing from type; the head and scape of antennae were said to be dark blue, rest black, becoming brown toward tip. Thorax black with a blue tinge, the propodeum purplish. Abdomen black, second, third, and fourth segments above (now) brownish, rest of abdomen with purple tinge; thorax above with purple appressed pubescence; thorax with long hair on pleura and coxae, moderately long on pronotum; abdomen with appressed pubescence above, tip with short, stiff, sloping bristles; propodeum with long, erect hair; pronotum arcuate behind; scutellum with a low median carina; propodeum with large anterior tubercles by the spiracles,

coarsely ridged above, but smooth in middle of posterior slope; median groove behind. Abdomen rather broad on basal segment, little broader on second, strong groove on second ventral before middle. Legs rather stout, tibiae and tarsi very spiny, hind tibiae above with row of moderately short teeth, the spines longer, and many short stiff bristles, inner spur almost one-half of basitarsus.

In the fore wings (which have a violaceous iridescence) there is a pale scar in base of second discoidal cell; marginal cell long, widest at end of second submarginal cell, and here almost as broad as second submarginal cell, latter more than twice as long below as broad, base strongly oblique, end scarcely sloping, receiving first recurrent vein near tip; third submarginal cell fully twice as broad at upper end as second, below one-third longer than second, outer side sloping, and then curved down, receiving second recurrent vein (straight) plainly before the middle; basal vein ends much before transverse, lower section bulging toward base; in hind wings the anal ends plainly beyond forking of cubitus, outer cross-vein much beyond middle of radial sector.

Length of fore wings 20 mm.

Type female, from Quito, Ecuador (James Orton), M. C. Z. no. 497.

Calopompilus fidanzae Holmberg (Priocnemis)

From Mendoza (C. E. Reed), Potrerilios, Mendoza; 16 to 20 March, 4500 ft. (Cornell Univ. Exped.) and Mendoza 28 March (Joergensen coll.).

The very short description of male agrees so well that I think the determination must be correct.

The body of male is very hairy, the wing-tip broadly dark. In the female (not previously noted) the body is scarcely less hairy; the dark tip of fore wing wholly beyond the closed cells; clypeus scarcely concave in middle below; vertex very broad, second plus third antennal joints scarcely equal vertex-width; ocelli in a broad triangle, laterals much nearer each other than to the eyes; pronotum angulate behind; propodeum with a median furrow, posterior slope almost concave; basal segment of abdomen with long hairs above, short hairs at tip of abdomen; teeth on hind tibia small, spines plainly higher, and some long hairs much higher, inner spur about one-third of basitarsus; venation much as in others, marginal cell very long, outer side of third submarginal cell bent or curved; in hind wings anal vein ends much beyond forking of cubitus.

Length of fore wings of female 18 mm.

Calopompilus parvulus spec. nov.

♂ Black; antennae rufous, basal joint black; a narrow yellowish orbital line reaching as high as base of antennae; hind border of pronotum more or less yellowish; legs black, front tibiae and tarsi and extreme tip of femora yellowish, spurs pale yellowish; wings nearly hyaline, tips darker, veins dark. Clypeus hairy all over, basal joint of antennae hairy below; front and vertex rather densely hairy; hair on pronotum and pleura fairly dense, but shorter than on head; propodeum with long hair and dense on sides; coxae hairy, but not densely; a few short hairs on basal part of first segment of abdomen. Clypeus truncate below; antennae moderately thickened, third joint scarcely longer than fourth; face much widened above; ocelli in a low triangle, lateral ocelli very much nearer each other than to the eyes; pronotum arcuate behind; propodeum (from side) evenly and only slightly arched, microscopically striate; basal abdominal segment moderately swollen; second slightly constricted at base, tip with only minute hairs; ventral segments with a few long hairs each side; legs with few distinct spines, hind tibiae with a row of minute ones, inner spur of hind tibia not one-half of basitarsus; claws with a minute tooth toward base.

Marginal cell of fore wings about as broad as the second submarginal cell, latter much longer than broad, base oblique, apical vein not sloping, receiving the first recurrent vein a little beyond middle; third submarginal cell a little longer and the tip broader than the second, outer side oblique, but slightly curved, receiving the second recurrent scarcely beyond the basal third.

The subgenital plate is a little longer than broad at base, with a median ridge, but no carina, surface with many large punctures, and fairly long hairs, sides sloping slightly, tip broadly rounded.

Length of fore wing 7.5 mm.

From Cosquin, Sierra de Cordoba, Argentine 1 to 9 March (Cornell Univ. Exped.).

Type at Cornell Univ., paratype M. C. Z. no. 26628. A larger specimen from Colonia, Argent. is like in color, except the wings are faintly yellowish, and the spurs almost black, and probably belongs to another species.

Calopompilus helas spec. nov.

♀ Body black, last segment of abdomen with some golden hairs near tip; antennae yellowish to rufous, except a little more than

basal half of first joint which is blackish; legs black; wings evenly blackish, somewhat iridescent, faintly bluish, veins black. Head moderately densely haired on front and vertex, not heavily haired below; clypeus with short hairs above, below with some longer ones; basal joint of antennae not hairy; pro-and mesonotum above with only very short, fine hairs; propodeum with rather long but not densely haired; basal segment of abdomen above with some long hairs; all coxae with numerous but not noticeably long hairs as in *C. edmondii*; femora with some hairs, rather long ones beneath.

Clypeus broad, scarcely concave below; third plus fourth antennal joints a little longer than vertex-width; lateral ocelli about one and one-half times as far from eyes as from each other; pronotum behind strongly concave, not angulate; propodeum short, with faint median line; posterior slope plainly striate, rather coarsely above. Legs moderately spined, inner spur of hind tibia not one-third of basitarsus.

In fore wing the venation is much as in *C. vitreus*, but marginal cell not so much narrowed toward tip, and the third submarginal cell is shorter, and the outer side does not recurve below middle; the first recurrent vein ends beyond middle, but before apical third, the second recurrent (weakly curved) ends a little before middle.

Length of fore wing 8.5 to 10.5 mm.

From Cosquin, Sierra de Cordoba, 1 to 9 March; Chilecito, La Rioja, 19 February, both Argentine, (Cornell Exped.). Type in Cornell Univ.; paratype there and in M. C. Z. no. 26627.

Male, with the same data, is similar in color to the female, except that four or five segments near tip are black, at least above; abdomen constricted at base of second segment. The head, clypeus, and basal antennal joints are very densely clothed with long black hair; the subgenital plate is broad and broadly rounded and (from above) slightly emarginate in middle of tip; the surface is strongly pitted, and with rather long but not numerous hairs.

Calopompilus edmondii Brèthes (Salius)

♀ Body black, abdomen toward tip sometimes with reddish or purple sheen; antennae with the first and second and the last two joints black, others yellowish to rufous; legs black, sometimes the hind pair is paler on basal part of tarsal joints; wings brown, veins black; a pale spot in base of first discoidal cell.

Head and clypeus densely hairy, very long on front and on basal joint of antennae; pronotum and even mesonotum in front with

rather long hairs; propodeum densely long-haired; basal segment of abdomen above with very short hair, last two segments toward tip hairy, and more hairy on venter; all femora with long hairs, and coxae with hairs as dense and long as on propodeum.

Clypeus broad, truncate below; third joint of antennae about one and one-fourth times as long as fourth, the third plus fourth not equal to vertex-width; ocelli in a low triangle, lateral ocelli fully twice as far from eyes as from each other; pronotum slightly angulate behind; propodeum short, with faint median line above, posterior slope only in certain views very faintly striate, but usually with a few short ridges on the side near the turn.

Legs heavily spined, inner spur of hind tibia about one-third of basitarsus. In fore wing the marginal cell is slender, but not so much so nor as pointed at tip as in *C. vitreus*; the second submarginal cell more than twice as long below as broad, first recurrent ends at apical third; third submarginal about one third longer than second below, but little longer above, second recurrent (slightly curved) ends a little before middle; in hind wing the anal vein ends scarcely beyond forking of cubitus.

Length of fore wing 14 mm.

From Puno, Peru, 1–4–75 (S. Garman) and one from "Peru" (Cornell). Described from Peru; also some from Puno, Peru, May (Soukup coll.); Arequipa, Peru, and Iquitos, Peru (H. Bassler) in Amer. Mus. Nat. Hist.

Calopompilus fraternus spec. nov.

Female. Very similar to *C. helas*. The hair on head, thorax and coxae is longer and denser; the vertex is broader, the width somewhat more than third plus fourth joints of antennae; the lateral ocelli a little further from eyes than from each other, and ocelli in a broader triangle than in *helas*. The pronotum is arcuate behind, and the propodeum does not show striae or ridges at upper corners of posterior slope; the legs are about the same. In the fore wings the marginal cell ends more abruptly, and the first recurrent vein ends only a little beyond middle; the third submarginal cell is shorter than in *helas* and the outer side less sloping; the second recurrent ends near basal third of third submarginal cell.

Length of fore wing 12 mm.

From R. O. del Uruguay (Cornell lot 631, sub 101). Type at Cornell Univ., paratype in M. C. Z. no. 26626.

CALOPOMPILUS EREBUS spec. nov.

Male. Black throughout; the wings evenly, but not deep black; the abdomen shows a purple sheen. Clypeus hairy all over, rest of head, including basal joint of antennae, densely black-haired; also on pronotum; on mesonotum much shorter; propodeum with long but hardly dense hairs; all coxae densely long haired, and there are numerous hairs on the femora; base of abdomen with some very short fine hairs, much longer ones on sides, tip with only a few short hairs; venter with hair on all segments except basal.

Text fig. 2. Outer claw of front tarsus.

Clypeus much narrowed below, margin scarcely concave; face much widened above, vertex-width about equal to second plus third plus fourth antennal joints; ocelli in a broad low triangle, laterals much nearer each other than to eyes; antennae about as long as fore wing, beyond middle the joints are a little convex below, and concave above. Pronotum behind strongly arcuate, almost angulate; propodeum, from side, evenly curved, very finely striate, scarcely noticeable; abdomen somewhat constricted at base of the second segment.

In fore wings the marginal cell does not narrow much except on the last abscissa, second and third submarginals much as in *C. edmondii* the third but little longer than second, end of third sloping strongly at first then curving down to medius, not recurving; first recurrent ends a little before apical third of second submarginal cell, second recurrent (faintly curved) ends a little before middle of third submarginal cell.

Length of fore wing 12.5 mm.

One from San Ignacio, Argentine, 15 March (Joergensen collector). Type M. C. Z. no. 26629.

It agrees with *C. constrictus* in color and the constriction of abdomen, but this latter point is common to males of other species; it differs in many points of structure, venation, and especially in the very hairy head.

Calopompilus relativus spec. nov.

Female. Very similar to *C. vitreus* Fox; body black, apical part of antennae rufous; fore wings more yellowish than in *C. vitreus*, the structure similar; the clypeus is the same, the face much broader, so that the vertex-width is much longer than in *vitreus*, the ocelli in a broader low triangle (about equilateral in *vitreus*), the lateral ocelli fully three diameters apart, and as far from eyes as from each other; last seven joints of antennae rufous, the second plus third joint not equal to vertex-width; pronotum behind angulate as in *vitreus*, the propodeum shorter than in *vitreus*, the upper border of propodeum and the thorax (from side) forming a much stronger curve than in *vitreus*; on hind tibia the outer row of teeth are very small and only on basal half; inner spur of hind tibia more than two-fifths of basitarsus, but plainly less than a half; there are scattered fine long hairs on femora as in *vitreus*.

Venation very similar, but the second and third submarginal cells are not as elongate as in *vitreus*, and the end of the third is sinuous, but it does not recurve to end on medius; first recurrent ends only a little beyond middle of second submarginal cell; second recurrent ends near middle of third submarginal cell; in hind wings the anal vein ends a little beyond the forking of cubitus.

Length of fore wing 12 mm.

One female from Tucuman, Argentine (C. S. Reed). Type in Cornell Univ.

The difference in width of face and vertex and consequent position of ocelli, and the shape of propodeum, and the venation separate it from *vitreus*.

Calopompilus vitreus Fox (Salius, Priocnemis)

From Kartabo, British Guiana, 30 October (Wheeler) and Kawkoegron, Saramacoa River, Surinam, 9 June (Cornell). Achinamiza, Peru, 27 August (Bassler) A. M. N. H.); Belem, Para, Brazil, May; described from Rio de Janeiro.

Thorax and propodeum hardly at all hairy and the few hairs on head, front coxae, and femora are very long, as long as basal antennal joint. A row of about a dozen rather sharp teeth on hind tibia, inner spur one-third of basitarsus; marginal cell about twice as long as distance to tip; second submarginal cell more than twice as long below as broad; third submarginal cell much longer below and some longer above than second, outer side sharply bent below middle, second recurrent vein (slightly sinuous) ends at basal two-fifths of cell.

Calicurgus Lepeletier

The difference usually given to distinguish this genus from Priocnemis is that the basal vein ends at the transverse, while in Priocnemis it ends much before transverse. It is not unusual to find specimens with the basal ending a little or even plainly before transverse, however it is never so far before as in Priocnemis. However, a better character to distinguish Calicurgus is the enlarged and slightly curved spine at upper tip of front tibia. The pronotum is usually nearly vertical in front. The males have the subgenital plate rather short and hind tarsi not bristly.

Synopsis of species

1. Abdomen wholly rufous, or only basal segment dark 2
   Abdomen with at least one segment black besides the basal .. 3
2. Legs, including coxae, rufous ..... *fratellus*
   Coxae and trochanters black, rest of legs yellowish or rufous; wings banded ..... *rufigaster*
   Legs wholly black; basal segment partly black; wings nearly evenly dark ..... *loranthe*
3. Abdomen yellowish on first and second segments; venter partly pale 4
   Abdomen black on all segments 6
4. Pronotum yellowish on hind border 5
   Pronotum not yellowish behind; legs black, except hind femora and tibiae are rufous ..... *australis*
5. Legs yellowish except on last one or two tarsal joints, which are black; no black on second segment ..... *huitaca*
   Legs yellowish except front femora and tibiae and bases of mid and hind femora which are black; black spot on second segment above; wings nearly evenly fumose ..... *quitus*
6. Mid and hind femora rufous, else mostly black 7
   If mid and hind femora rufous, rest of legs also 8
7. Mid and hind coxae and trochanters rufous; fore wings nearly evenly dark ..... *andicolus*
   Mid and hind coxae and trochanters black; fore wings hyaline, but with two brown bands ..... *jocaste*
8. Fore wings with two dark bands 9
   Fore wings unbanded, or nearly covered by a dark spot 10
9. Clypeus not three times as broad above as long in middle; frontal groove distinct only below ..... *pretiosus*
   Clypeus three times as broad as long, frontal groove complete .... *machetes*

10. Fore wings without large black spot; hind margin of abdominal segments often rufous ..... *marginatus*
Fore wings with a large black spot 11

11. Only the apical margin of wings hyaline, rest black ..... *orejones*
Basal fourth of basal cell and behind it hyaline, rest black ..... *nubilus*

The species can be arranged in four groups by the shape of the pulvillus as shown in the figures; *huitaca* and *quitus* belong to Fig. 33; *marginatus* and *jocaste* to 34; *nubilus, orejones, andicolus, rufigaster, loranthe, australis,* and *fratellus* to 35; *pretiosus* and *machetes* to 32. In the genotype it is more pointed than 35 but some species in 35 are more pointed than in the figure.

Calicurgus andicolus spec. nov.

Body, legs, and antennae deep black; coxae, trochanters, and femora of mid and hind legs rufous, rest of legs black; wings rather glassy, fore wings with a brown band over basal vein, another band occupying marginal cell, second and third submarginals, with an extension into third discoidal cell, tip of wing scarcely darkened, stigma black, veins dark brown to black. Clypeus, lower face, and coxae slightly sericeous.

Clypeus fully two and one-half times as broad as long, below truncate, and with a smooth border, surface hairy; face a little higher than broad, narrowed above, vertex width about equal to the long third joint which is twice the length of basal joint of antennae, front with short dark hair, vertex with longer hair, ocelli in a fairly broad triangle, the laterals a little nearer each other than to eyes; pronotum very short above, arcuate behind, few hairs on shoulders; pleura hairy, propodeum fully as long as broad, narrowed behind, from side a slight but even curve, posterior half with quite short hairs.

Abdomen slender, shining, first segment much longer than broad behind, last two segments very hairy, near tip some stiff hairs; venter with a few long hairs on each segment. Legs not very long, hind femora not nearly reaching tip of abdomen, all femora with very short fine hairs beneath, those on front femora longer; mid tibiae with a row of short, sloping bristles above; hind tibiae with ten or twelve teeth, small and sloping, each with a short stiff spine, inner spur more than one-half basitarsus.

In fore wings marginal cell about two-thirds its length from wing tip, about as broad as second submarginal cell, latter rhomboidal,

but top a little shorter than bottom, receiving the first recurrent vein plainly beyond middle; third submarginal cell about twice as long below; but no longer above than second, narrowed more than one-half above, outer side slightly curved, receiving the second recurrent vein barely beyond basal third; basal vein evenly curved, ends just a little before transverse; in hind wings anal vein ends just before forking of cubitus, outer cross-vein at middle of radial sector.

Length of fore wings 10 mm.

One female from Banos, Tunguragua, Ecuador, 1600 to 1900 m. (W. C. MacIntyre). Type M. C. Z. no. 26645.

Calicurgus nubilus Fox

From Kartabo, 15 December; Essiquibo River (source) (J. Ogilvie); Kamakusa (Lang), all British Guiana; Chapada, Brazil (paratype); Campinas, Sao Paulo, Brazil, March (Williams). *Priocnemis sericeiornatus* Cameron from Demerara is the same species.

Calicurgus orejones spec. nov.

Very similar to *C. nubilus* Fox, but readily separated by having the black of fore wings extended to base, in *nubilus* nearly all before basal vein is hyaline, the apical border pale; hind wings wholly hyaline. Body black, also legs and antennae. Clypeus, lower face, coxae below, most of lower mesopleura, posterior slope of propodeum silvery sericeous; the abdomen less distinctly sericeous.

Clypeus much like *nubilus*, but the shining anterior margin is more narrow, face more narrow below than *nubilus*, but the vertex is fully as broad, the lateral ocelli as near to each other as to eyes, fourth antennal joint fully as long as vertex-width, no hairs on front, two long ones on vertex, rest of body much like *nubilus*, abdomen very hairy towards and at tip; propodeum with fine white hair behind. Venation does not differ essentially from the common species.

Length of fore wings 8 mm.

A female from Jatun Yacu, Rio Napo watershed, Oriente, Ecuador, 700 m. (W. C. MacIntyre). Two others from Tena, Ecuador, 4 March, 20 April (F. X. Williams); Type M. C. Z. no. 26649. Paratype there and with Mr. Williams.

Calicurgus jocaste spec. nov.

Female. Body black, antennae brown to black, front legs dark brown, rather paler on inner side of femora, mid and hind coxae and

trochanters black, their femora pale rufous, tibiae and tarsi brown. Lower face and clypeus with white pubescence. Fore wings hyaline, a brown band over basal vein and a broad brown band occupying basal half (or more) of marginal cell, all of second and third submarginals, and apical part of third discoidal cell; stigma black, veins brown to black; hind wings hyaline, veins brown.

Clypeus two and one-half times as broad as long, truncate below, with some hairs and bristles above; face broad below, much narrowed to vertex, latter not nearly equal to third joint of antennae, frontal line faint, front without hairs, a long one on vertex; ocelli in a narrow triangle, hind ones about as near eyes as to each other; pronotum almost angulate behind, no hairs, but the margin whitish pubescent; pleura also whitish; propodeum whitish across apical part and at basal corners; propodeum steeply sloping behind, basal part short, a few short white hairs on posterior slope.

Abdomen with fine stiff hairs at tip above, below are some longer white hairs. Legs slightly sericeous above on all tibiae in certain views, mid tibiae with short stiff bristles above, hind tibiae with a row of long, sloping teeth, each with a spine at tip, a row of bristles on outer side, also a row of a few bristles on inner side, inner spur of hind tibiae more than half the basitarsus.

In the fore wings the marginal cell is but little more than one-half its length from wing-tip, its width equal to that of second submarginal cell, latter a little longer below than broad, its base more oblique than tip, receiving the first recurrent vein a little beyond middle; third submarginal cell much longer below than second, but little, if any, longer above, outer side straight, and sloping, receiving the second recurrent vein (rather strongly but evenly curved) near end of basal third; basal vein ends barely before the transverse; in hind wings the anal vein ends before forking of cubitus.

Length of fore wing 7 mm.

From Belem, Para, Brazil, June, and Jabaty, Para, Brazil, May (both taken by F. X. Williams). Type M. C. Z. no. 26758, paratype with Mr. Williams.

Calicurgus quitus spec. nov.

Head, thorax, and antennae black, clypeus with the lower and side margins yellowish, pronotum with hind border yellowish; abdomen with first and second segment yellow above and below, petiole black, and a transverse black spot on second segment near base, rest of

abdomen black, except last segment above partly testaceous, and the third segment narrowly testaceous behind, and a yellowish streak on each side near tip, directed beneath. Front and mid femora mostly black, except tip, these tibiae pale, but dark in middle, tarsi pale, but last few joints black; hind femora mostly dull rufous, but base black, tibiae and tarsi rufous except last three tarsal joints black. Wings faintly yellowish, stigma and veins brown.

Clypeus two and one-half times as broad as long, lower margin truncate, upper margin nearly parallel. Face higher than broad, some golden pile on lower orbits, vertex about two-thirds of base, frontal line distinct below, ocelli in narrow triangle, laterals much closer to each other than to eyes, back of head with some yellowish hair, antennae quite long and slender, third joint plainly longer than vertex-width, front with few hairs, longer ones on vertex. Pronotum broadly arcuate behind, scarcely any dorsal length, all frontal which is vertical. Propodeum longer than broad, evenly rounded transversely, from side low and little curved, above with yellowish to golden hairs and behind with longer pale hairs.

Abdomen moderately slender, short hairs above near base, some pale stiff bristles on last segment above, venter with few pale hairs, mostly beyond middle.

Legs not especially long, hind femora not reaching tip of abdomen, all femora with minute fine hairs beneath, pulvillus large, at tip divided into two dark brown parts and each notched at tip, mid tibiae with three spines above beyond middle, hind tibiae with a row of very low, sloping teeth, each with a fairly long bristle, inner spur more than one-half of basitarsus. Coxae with some yellowish pubescence, and some on front and mid femora.

In fore wings the marginal cell is about three-fourths its length from wing-tip, narrowed and pointed at tip, abscissae three and four being in a nearly straight line; its width no more than that of second submarginal cell; stigma rather long, more than its width in marginal cell and slightly rounded behind; second submarginal cell rhomboidal, not quite as long as broad, receiving first recurrent vein at middle; third submarginal cell more than two times as long below, but shorter above than second, narrowed more than one-third above, outer side evenly curved, receiving second recurrent (bent in middle) before end of basal fourth; basal vein an even curve, ends a trifle before transverse vein; in hind wings anal vein ends at forking of cubitus, outer cross-vein about one-half way out on radial sector.

Length of fore wing 9 mm.

One female from Banos, Tunguragua, Ecuador, 1000 to 1900 m. (W. C. MacIntyre). Type M. C. Z. no. 26646.

Calicurgus loranthe spec. nov.

Female. Head, thorax, antennae, legs deep black, abdomen dark rufous above and below, usually the basal segment has some black above, and the second segment in the middle, neither a definite mark; lower face and clypeus slightly whitish pubescent; fore wings evenly pale brownish, stigma and veins nearly black; hind wings hyaline, veins black.

Clypeus a little more than twice as broad as long, lower margin straight across, a few bristles on surface; face broad below, narrowed above, frontal line complete, front and vertex with erect hair, not very short, lower head densely long-haired; ocelli in a fairly long triangle, hind ocelli more than three diameters apart, a little nearer to eyes than to each other; vertex-width fully equal to second plus third antennal joints. Pronotum slightly angulate behind, with short hairs above, pleura slightly hairy in front; propodeum with short basal part, posterior part a steep slope, long hairs above; abdomen moderately slender, widest near tip of second segment, group of stiff black bristles at tip, venter with a few rather long hairs. Front coxae in front and prosternum with long hair, mid and hind coxae with a few hairs below; mid tibiae with numerous short spines above, hind tibiae with a row of oblique teeth, each tipped with a short spine, a row of short spines along upper outer side, inner spur fully equal one-half of basitarsus.

In fore wings the marginal cell is about two-thirds its length from wing-tip, second submarginal cell nearly rhomboidal, but slightly narrowed above, little if any longer below than broad, receiving the first recurrent vein beyond middle; third submarginal cell as long or a little longer below than second, narrowed to about one-third above, and shorter than the second above, receiving the second recurrent vein (bent near middle) before middle; basal vein ends a little before transverse, and in hind wings the anal vein ends a little before forking of cubitus.

Length of fore wing 6 to 8 mm.

From Banos, Oriente, Ecuador, 6000 ft., 26, 30 October, 27 December, 20 January (F. X. Williams). Type M. C. Z. no. 26759; paratypes there and with Mr. Williams.

Calicurgus marginatus spec. nov.

Body dull black, legs more or less dull rufous, femora sometimes partly black; tips of tarsi black; antennae dark brown, basal joints pale below; narrow hind border of abdominal segments rufous and with yellowish pubescence, sometimes venter with a yellow spot on middle of hind margin of second and third ventral segments; propodeum with a broad band of pubescence at tip; silvery or golden according to view, and some white pubescence at base; on hind margin of pronotum a narrow band of pale golden pubescence, lower corner of pronotum and lower part of mesopleura, clypeus and face with this same silvery or golden pubescence. Fore wings yellowish to almost brownish yellow, but beyond closed cells it is paler, sometimes third submarginal and third discoidal cells hyaline; stigma yellowish, veins brown.

Clypeus hardly two and one-half times as broad as long, lower margin slightly concave, face much higher than broad, much narrowed above, vertex width no longer than fourth antennal joint, third joint one-third longer than fourth, antennae very slender; ocelli in a narrow triangle, laterals a little nearer eyes than to each other; frontal line fine; pronotum very short above, behind broadly arcuate, front nearly vertical; propodeum short, very steeply though evenly sloping, no median groove; abdomen rather slender, slightly pubescent on sides, and more on venter, long fine hairs on last segment, a few on preceding segment above.

Legs rather slender, teeth on hind tibiae above low and elongate, the oblique spines projecting above, inner spur not quite two-thirds of basitarsus. In fore wings the marginal cell is about one-half its length before wing-tip, broader than the second submarginal cell, third and fourth abscissae in a nearly straight line; stigma fully its width in marginal cell, and below slightly rounded; second submarginal cell about one and one-half times longer below and a little longer above than the second, outer vein oblique and little curved, receiving the second recurrent near basal third; basal vein ends scarcely before transverse; in hind wings anal vein ends a little before forking of cubitus.

Length of fore wing 8 mm.

Two females from Nova Teutonia, St. Catharina, Brazil, 6 May, 2 November (F. Plaumann coll.). Type M. C. Z. no. 26648.

Calicurgus australis Holmberg? (Salius)

Females from Cosquin, Sierra de Cordoba, Argentina, 1 to 9 March (Cornell Univ. Exped.), and Rio Grande do Sul, Brazil.

Head and thorax black, abdomen rufous on first three segments, others brown or nearly black, antennae, front and mid legs, and hind tarsi black, hind femora and tibiae rufous; wings nearly black in middle part, paler toward tip; propodeum high and more sloping behind than in *nubilus*; legs not very long; hind tibiae evenly toothed above, each tooth with a spine, and other spines in rows each side; inner spur more than one-half of basitarsus; the pulvilli are moderately large, of blunt pointed type like *C. nubilus*.

This is quite probably Holmberg's species, but the very brief description is hardly sufficient for decision.

Calicurgus pretiosus Fox

From Muzo, Dept. Boyaca, Colombia, 900 m. (Bequaert); Caquiopa, Colombia, 19 March (Parish, Cornell); described from Rio de Janeiro, Brazil. Closely related to *C. machetes*. *Pompilus pulvillatus* Smith may be this species or *machetes*.

Calicurgus machetes Kohl

From Villa Nieve, San Lorenzo Mt., Colombia, 20 December, (Bequaert); Furo de Ressaco, Rio Amazon, Brazil, 10 September (Cornell); Tena, 4 March, Mera, February, both Ecuador and taken by Mr. Williams. Described from Rio de Janeiro. Fox records it from Santarem; it is possible that *C. cinereus* Fox is a synonym.

Calicurgus huitaca Banks

Described from a female from Colombia (Cornell Univ.).

Calicurgus fratellus Holmb. (Priocnemis)

One female from Villa Rica, Paraguay, November, agrees with brief description. It is near *rufigaster*, but coxae also yellowish, the face, especially vertex more narrow, the clypeus more rounded below, the antennae much shorter, and the second submarginal cell shorter.

Calicurgus rufigaster Banks

Described from the San Lorenzo Mts., Colombia, one female.

A male taken at same place and date as the female agrees in venation, and may be the true male. The head and thorax are black, the clypeus with a large triangular white spot each side, connected along lower border; lower face silvery. The pronotum has a narrow white border behind; the abdomen is mostly dark, but the second segment and part of third rufous above and below, and first segment partly below; tip of abdomen with a white spot; the front coxae are pale yellowish at tips; legs mostly dark, the front and mid femora rufous on apical half, also front tibiae and tarsi (except last two joints), mid tibiae rufous on more than basal half, dark at tip; tarsi pale, tips of joints black, and last joint wholly so; hind legs almost entirely brown beyond the black coxae, the tibial spurs whitish. The fore wings lack the brown cloud of the female. The clypeus is nearly as short as in female, the lower margin straight.

Length of fore wings 5 mm.

Calicurgus modestus Smith (Pompilus)

What I have identified as this species is a Calicurgus, only the male is known. Specimens from Bartica, British Guiana, 27 January.

The legs are largely pale yellowish to white, the hind trochanters black; clypeus and mandibles, except tip white; hind border of pronotum white and a white spot on lower lobe a little above front coxae; in front legs the last two tarsal joints black; abdomen whitish on first, second, and part of third segment, beyond black; tip with a white spot; extreme base of first segment black, and a dark spot on apical part of first and third segments. The venation is much like that of *rufigaster*, the third cell short and outer side curved.

Length of fore wings, 4 mm.

Priocnemis Schiödte

A number of species have been described from South America under this generic name; many that are known to me belong to Calicurgus or to some genera, often Priophanes, in the Pseudageninae. Still it is possible that there are some species in South America.

Amerocnemis Banks

The elongate body, very large clypeus, and markings suggestive of Batazonus readily separate these forms.

Synopsis of species, males

1. A pale reddish brown spot above antennae to ocelli; antennae with groups of three joints black and three yellowish, mesonotum with median pale stripe; abdomen not plainly banded..... *longulus*
   A black mark above antennae and over ocelli, antennae largely dark above, abdomen distinctly banded..... 2

2. Abdomen with segments dark at base, pale across tip, mesonotum with large pale spot in middle, hind femora dark above; propodeum with broad dark stripe each side..... *brasiliensis*
   First and second segments not plainly banded, mesonotum with two pale lines, united behind, propodeum with an interrupted dark line each side, hind femora not darkened..... *argentinica*

AMEROCNEMIS ARGENTINICA spec. nov.

Pale yellowish, a large black spot above antennae extending upward over ocelli and there with lateral branches to eyes and somewhat down each side on occiput, antennae with two or three joints at base, flagellum beyond black above, brown below; pronotum with a long dark streak on each lower side; mesonotum mostly black a large pale spot in middle behind with a line each side extending forward to front end; scutelli wholly pale; propodeum with a black line each side, interrupted near posterior end; first segment of abdomen nearly wholly pale yellow, second rufous on basal two-thirds, pale yellow across tip, segments beyond are black above, with a pale band across tip; pleura wholly pale; legs pale, tips of hind femora and the hind tarsi wholly dark. Wings hyaline, slightly glassy, stigma yellow, veins pale brown.

Clypeus two and one-half times as broad as long, lower edge truncate; face plainly higher than broad below, very little narrowed above, vertex-width nearly equal third plus fourth antennal joint, ocelli in a broad triangle, laterals nearer to eyes than to each other; pronotum angulate behind, with indented line in middle; propodeum scarcely as broad as long, from side sloping, scarcely convex.

Abdomen rather slender, about as broad as thorax, legs short, hind femora not reaching tip of abdomen, hind tibiae with a row of widely separated minute bristles above, inner spur plainly more than one-half of basitarsus.

In the fore wings the marginal cell hardly one-half its length from wing-tip, broader than the second submarginal cell; latter more than twice as long below as broad, narrowed one-third above, receiving

first recurrent beyond middle; third submarginal cell about one-third longer below than second, narrowed one-third above, outer side sloping, then bent near end, receiving the second recurrent vein (straight, oblique) near middle; basal vein ends much before transverse; in hind wings the anal vein ends beyond forking of cubitus, outer cross-vein more than half-way out on radial sector.

Length of fore wing 10 mm.

One male from Tucuman, Argentina (C. S. Reed) (Cornell Univ. coll.).

Amerocnemis bequaerti Banks

This, the type of the genus, and only known female, was described from Restrepo, Dept. Meta, Colombia, collected by J. Bequaert.

Amerocnemis brasiliensis spec. nov.

Pale yellowish white, a broad black mark from antennae up over ocelli and there spreads laterally nearly to eyes and behind over upper occiput; antennae with basal joint yellowish, flagellum black above, yellowish beneath; pronotum with a broad black mark across in front of hind margin; mesonotum black, with a nearly rectangular pale area in middle and each side a pale line extending forward; scutelli wholly pale, propodeum with a broad black stripe each side much nearer each other at base than at tip; pleura wholly pale; abdomen with basal half of first segment black, others black with a pale apical band, not so noticeable near tip. Legs pale, mid and hind coxae with a couple of black streaks or spots, hind femora darker above toward tip, hind tibia dark on apical third, hind tarsi brown.

Wings faintly yellowish, stigma and veins pale brownish. Clypeus nearly two and one-half times as broad as long, lower edge slightly, evenly convex. Face higher than broad, a little narrowed above, vertex-width about equal to second, plus third plus fourth antennal joints; ocelli in a broad triangle, laterals much nearer eyes than to each other; pronotum short above, angulate behind, propodeum about as long as broad in front, from side sloping but scarcely convex. Abdomen slender; legs rather short, hind femora not nearly reaching tip of abdomen, hind tibiae above with a row of only very minute bristles, inner spur more than one-half of basitarsus; little hair anywhere on body, some short and fine at tip.

In fore wings marginal cell one-half its length from wing-tip, broader than second submarginal cell; latter more than twice as long below

as broad, narrowed one-fourth above, receiving first recurrent beyond middle; third submarginal cell about one-third longer below than second, narrowed hardly one-third above, outer vein curved in lower part, receiving the second recurrent vein (nearly straight) before middle; basal vein ends much before transverse, sloping and curved; in hind wings anal ends beyond forking of cubitus, outer cross-vein beyond middle of radial sector.

Length of fore wings 11 mm.

One male from Barro Alto, Est. Minas, Brazil, November (Jose Blaser). Type M. C. Z. no. 26652.

Amerocnemis longula spec. nov.

Body yellowish to yellow-brown, abdominal segments more or less distinctly darker across tip. Propodeum largely brown on anterior two-thirds, but sides pale; mesonotum brown with a pale median stripe, hind border of pronotum yellow, in front a brown spot each side, a pale reddish mark above antennae up over ocelli and some brown on occiput above; antennae pale on joints one to three and seven to nine, black on joints four to six and ten to thirteen. Legs dull yellowish; wings faintly yellowish.

Clypeus a little more than twice as broad as long, upper edge convex, lower side truncate in middle, sides curved. Face narrow, much higher than broad, slightly narrowed above, second plus third antennal joint almost equal vertex-width, ocelli large, laterals not diameter from eyes, more than diameter from each other; pronotum angulate behind, rounded and sloping to collar in front; propodeum hardly as broad as long, from side lightly and nearly evenly convex, no median groove, thorax with only minute hairs; abdomen slender, first segment only about twice as wide at tip as at base, last segment above with some short hair, venter very hairy on last few segments. Legs slender, hind tibiae above and on sides with very short minute spines, inner spur more than one-half basitarsus.

In fore wings marginal cell hardly one-third length from wing-tip, much broader than second submarginal cell; latter nearly two and one-half times as long below as broad, little narrowed above, both ends oblique, receiving first recurrent vein near posterior third; third submarginal cell nearly one-third longer than second, narrowed one-third above, outer vein curved, receiving the second recurrent vein (straight) plainly before middle; basal vein ends much before transverse; in hind wings anal vein ends before forking of cubitus, outer cross-vein a little more than one-half way out on radial sector.

Length of fore wings 15 mm.

Two males from Hyutanahan, Rio Purus, Brazil, March (S. M. Klages). Type in Carnegie Museum, paratype in M. C. Z. no. 26653.

Priocnessus Banks

The greatly enlarged clypeus, raised much above mouthparts in both sexes separates this genus; the basal vein ends much before the transverse, and the latter is oblique; the front basitarsus is spined over nearly its entire surface. The known species are from northern South America.

Priocnessus prominens Banks

Type from Vista Nieve, San Lorenzo Mt., Colombia, 16 December (Bequaert).

Closely related to *P. neotropicalis* of Central America.

Nannochilus Banks

Abdomen sessile, no groove nor depression on second ventral segment. Legs slender, no teeth nor spines on upper side of tibiae, only minute spine-pits with very minute hairs, scarcely visible; claws cleft; no spines below on last tarsal joint. No hair on under side of head, very little elsewhere, none on propodeum. Antennae situated close to clypeus, and rather long and slender. In fore wings the basal vein is interstitial, or almost so, with the transverse, latter not oblique; the second and third submarginal cells both very short. In hind wings the anal ends before forking of cubitus.

Synopsis of females

1. Fore wings with two dark bands; all femora yellowish; basal joint of antennae also yellowish ..... *peruanus*
   Fore wings without dark bands 2
2. Front tibiae and tarsi yellowish; inner spur not one-half of basitarsus; third submarginal cell not as long as the second below ..... *colombianus*
   Front tibiae and tarsi black, as the others; inner spur fully one-half of basitarsus; third submarginal cell fully as long as second below ..... *obscurus*

Males

Tip of fore wings broadly dark ..... *colombianus*
Tip of fore wings scarcely darkened ..... *laevis*

Nannochilus obscurus spec. nov.

Body deep black, faintly sericeous on clypeus and lower face, coxae rather more plainly, almost silvery; abdomen faintly sericeous above on second to fifth segments; antennae and legs also deep black. Fore wings faintly blackish, but basal and first submarginal cell clear; hind wings nearly hyaline; veins and stigma black, second submarginal darkened and the shade spreading into third discoidal, but not a band. Clypeus more than twice as broad as long, sides sloping, lower edge truncate, lateral angles some distance above lower end of eyes; face much higher than broad, sides parallel, distinct median line, second plus third antennal joints fully equal vertex-width; lateral ocelli closer to eyes than to each other; pronotum not very short above, behind scarcely angulate; propodeum rather longer than broad, slightly narrowed behind, from side only a slight but even curve. Abdomen rather broad on first segment at tip, last two segments compressed; legs fairly slender, hind femora about reaching tip of abdomen; mid and hind tibiae above almost devoid of spines or bristles; inner spur fully one-half of basitarsus.

In fore wings the marginal cell less than its length from tip of wing, fully as broad as second submarginal cell; latter but little longer below than broad, both ends incurved, receiving the first recurrent vein beyond middle; third submarginal cell about as long as second and as broad as long below, outer side incurved at each end, almost angled in middle, receiving the second recurrent vein (nearly straight) beyond middle; stigma quite short; basal vein ends a trifle before transverse; in hind wings anal vein ends before forking of cubitus; outer cross-vein much nearer base of radial sector than to tip.

Length of fore wing 6.5 mm.

One female Nova Teutonia, Santa Catharina, Brazil, 29 January (Plaumann). Type M. C. Z. no. 26630.

Nannochilus colombianus Banks

Based on a female from Buenaventura, Colombia.

NANNOCHILUS PERUANUS spec. nov.

Body black, abdomen shining, legs largely yellowish, hind tibiae and tarsi brown, other tarsi and tibiae above yellowish brown; wings hyaline, a black band over basal vein and another broader band over marginal cell, second and third submarginal cells and somewhat behind; antennae brown, basal joint yellowish below and on inner side; clypeus and lower face silvery, some fine white pile on pleura, propodeum and abdomen; sting pale at tip, dark at base.

Clypeus very short, truncate, laterally not extending under eyes; face hardly narrowed above, minutely punctate, a fine median line; lateral ocelli almost as near to eyes as to each other, each side of anterior ocellus is a transverse depression; second plus third antennal joints equal vertex-width; pronotum broadly rounded behind; propodeum, from side, is low at base and though almost evenly curved slopes only a little to tip, above without hairs. First segment of abdomen longer above than broad behind, fourth and fifth segments slightly compressed, last ventral segment with a few hairs; legs slender, hind tibiae without spines above, inner spur hardly one-half of basitarsus.

In fore wings the marginal cell is a little more than one-half its length from wing-tip, it is plainly angled at end of second submarginal cell, its breadth there equal to that of submarginal cell.

Latter little longer below than broad, one-half as long above, base rounded, angled below just before middle where it receives the first recurrent vein; third submarginal cell plainly broader than long, shorter below than second, outer vein almost angled in middle receiving the second recurrent vein (scarcely curved) near middle; basal vein interstitial with transverse, lower section bulges slightly toward base; in hind wings the anal vein ends much before forking of cubitus, and the outer cross-vein is a little nearer to base of radial sector than to the tip.

Length of fore wing 5 mm.

Female from Valle Chanchamayo, Peru, 1600 m., 1 April (Weyrauch). Type M. C. Z. no. 26631.

NANNOCHILUS LAEVIS spec. nov.

Male. Body black, antennae brown, first and second joints above and below pale yellowish, palpi pale; femora mostly black, front and mid ones paler at tip, front and mid tibiae yellowish, front tarsi also, mid tarsi more brown, hind tibiae and tarsi brown, all spurs pale

yellowish; wings hyaline, fore wings faintly fumose toward tip, veins and stigma pale brown, tegulae yellowish. Lower face and clypeus with white pubescence, above the antennae and on pronotum, mesonotum the pubescence so scant that it only dulls the black; propodeum rather densely white pubescent, mostly on sides and behind; abdomen shining but with some fine pubescence as on mesonotum, denser and more evident toward tip; coxae and femora also slightly sericeous, and the pleura more distinctly so, no hairs anywhere.

Head much broader than thorax; clypeus not twice as broad as long, truncate in middle below; face broad, not narrowed above, from in front vertex convex; ocelli in a low triangle, hind ones a little nearer each other than to the eyes, antennal joints moderately long, third plus fourth joints about equal vertex; pronotum not long, angulate behind, rounded to the steep slope in front; mesonotum shows a sharp, low carina each side; scutellum elevated, propodeum about evenly rounded, with a median groove, from side low and scarcely convex; abdomen very slender and short.

Front and mid legs rather long, hind femora reach much beyond abdomen.

In fore wings the marginal cell is hardly its length from wing-tip, broader than second submarginal cell, latter small, nearly square, receiving first recurrent vein beyond middle; third submarginal cell but little longer than second, higher than long, tip curved, and nearly as long above as below, receiving the second recurrent vein (slightly curved) beyond middle; basal vein ends at transverse; in hind wing the anal vein ends a little before forking of cubitus.

Length of fore wings 3.5 mm.

One from Cumoto Areto, Savana, Trinidad, April (R. Thaxter). Type M. C. Z. no. 26776.

From *N. columbianus* separated by the absence of a broad apical band to fore wings; the third submarginal cell longer than second, both recurrents end beyond middle.

Balboana nom. nov.

Balboa Banks 1927 is preoccupied by Distant in the Hemiptera in 1893.

The species seen from South America are as follows:

1. Legs (including coxae) yellowish; propodeum striate only on outer corners; a milk-white spot beyond third submarginal cell; small species ..... *fulvipes*
   At least the femora largely black 2

2. Pale of wings hyaline, not yellowish; beyond third discoidal cell it is dark out to margin ..... *nigrina*
   Pale of wings yellowish, and occupying part of area beyond the third discoidal cell 3

3. Stigmal band with an extension backward along the first recurrent vein; no yellowish on hind margin of pronotum, basal band much narrower than space between it and stigmal band. . *fenestralis*
   Stigmal band without extension backward along first recurrent vein 4

4. Band on basal vein hardly one-half the space to the stigmal band; hind border of pronotum yellowish; spots of pubescence on sides of abdomen; propodeum with spots behind and in front ..... *auripennis*
   Band on basal vein almost as broad as space to stigmal band; no yellow on hind border of pronotum, propodeum almost wholly golden above; no spots on sides of abdomen ..... *elegans*

Balboana nigrina spec. nov.

Black on head, thorax, propodeum, and abdomen, a small silvery white spot each side at end of the propodeum, antennae black, but joints four, five and six are dull yellowish, and seven is below; tip of abdomen fulvous; legs black, the tarsi dull yellowish brown, spurs pale. Fore wings somewhat smoky, a rather broad black band over basal and transverse veins, below extending a little outward; lower wing margin toward base with a black streak; another band occupying basal half of marginal, all of second and third submarginal, apical part of third and basal part of fourth discoidal cells; this band is brown, but the submarginal cells are black; beyond this band the wing is more smoky except for an elongate hyaline white spot beyond the third submarginal cell. Hind wings smoky beyond cross-vein.

Clypeus about three times as broad as long, broadly truncate below, with extremely minute hairs. Thorax, propodeum and most of abdomen with fine appressed, mostly whitish hair; antennae short, thickened toward tip; second plus third joint not equal to vertex-width; a faint median line above antennae for a short distance; ocelli in a broad triangle, laterals about as near eyes as to each other; pronotum almost angulate behind; propodeum at base with indication of a median groove, beyond with the usual transverse rugae, but the posterior slope without them except near sides.

Abdomen polished and shining, last two segments with short hairs. Mid and hind tibiae each with some very short fine spines, more on

outer side than above; inner spur of hind tibiae almost one-half of basitarsus.

In fore wing the marginal cell is moderately long, widest at end of second submarginal cell, and more than one-half its length from wing-tip; second submarginal cell about as long below as high, narrowed above, receiving the first recurrent before middle; third submarginal cell higher, but little longer than second, narrowed about one fourth above, end straight and but little oblique, receiving the second recurrent (slightly curved) a little before middle, third submarginal about three times its length from outer margin of wing; lower basal vein nearly straight, ending plainly before the transverse; in hind wings the anal ends much before forking of cubitus.

Length of fore wing 9 mm.

From Nova Teutonia, Santa Catharina, Brazil, 24 August (F. Plaumann). Type M. C. Z. no. 26189.

Balboana fulvipes Banks

Described from Kartabo, British Guiana, July-August (Wheeler); also from Mayaro Bay, Trinidad, 6 December (N. A. Weber).

Balboana fenestralis spec. nov.

Black, a golden spot each side on metanotum, clypeus and a small mark each side above clypeus faintly silvery. Fore wings slightly yellowish, more plainly in middle; two brown bands, first rather narrow over basal and transverse veins, second over basal half of marginal cell and extending behind, and with an extension backward along the first recurrent vein and nearly reaching the first band; the tip of wing with a moderately broad brown border extending behind and connected to the second band, thus leaving four yellowish spots: one before the first band, one beyond the second band, and two between; in hind wing the tip narrowly brown.

Head and thorax without hair except a few above, propodeum bare. Clypeus short, very broad, truncate below; ocellar triangle broad, ocelli large, the hind ones nearer to eyes than to each other; antennae rather short, plainly thicker toward tip; pronotum angulate behind; scutellum faintly transversely striate on sides; propodeum rather high before the posterior slope, transversely striate, most distinctly near the turn. Legs rather short, hind tibia with two rows of short spines above, none one-half diameter of joint; inner spur nearly equals one-half of basitarsus; mid tibia with short, stout spines.

Basal segment of abdomen somewhat depressed, last two segments hairy above and below.

In fore wings the marginal cell is pointed at tip, about half its length from the wing-tip; second submarginal cell about one-fourth longer than high, both ends oblique, receiving the first recurrent vein near apical third; third submarginal above hardly one-half as long as the second, but below longer than second, the ends divergent, receiving the sinuous second recurrent before middle; lower basal vein barely curved, ending just before transverse, latter scarcely oblique.

In hind wings the anal ends much before the forking of cubitus.

Length of fore wings 12 mm.

From Buenavista, Santa Cruz, Bolivia (Steinbach, Cornell). Type Cornell Univ. Coll.; paratype M. C. Z. no. 26193.

Balboana auripennis Fabr. (Pompilus)

Specimens from Kartabo and Bartica, British Guiana, in March, April, June, September, November, and December. Fox records it from Brazil; also Jatun Yacu, Rio Napo watershed, Ecuador (MacIntyre).

The description of *Pompilus moorei* Cameron from Demerara fits *B. auripennis*.

Balboana elegans spec. nov.

Body, antennae and legs black. In general very similar to *auripennis*, but band on basal vein is much broader so that it is almost as broad as the space to the stigmal band, the space beyond stigmal band whiter; no golden nor yellowish on hind border of pronotum, and no spots on sides of abdomen; the propodeum is covered above (except around spiracles) with brilliant golden pubescence, and a golden spot each side of postscutellum.

The clypeus is plainly a little longer in middle than in *auripennis*, and wings less slender; lateral ocelli plainly nearer to each other than to eyes (in *auripennis* not so much so); the depression each side above antennae is not so large and rises more suddenly than in *auripennis*; the propodeum has the posterior slope more nearly vertical than in the common species, and is coarsely striate, and the basal part more definitely separated. Venation about as in *auripennis*, but the second recurrent is more bent in middle and ends nearer to middle of third cell than in any specimen of *auripennis* seen, but this varies in *auripennis*.

Length of fore wing 13 mm.

A female from Province Sara, Bolivia (Steinbach). Type M. C. Z. no. 26663.

Priochilus Banks

This is agenoid in form and venation, but larger, and separated by the cleft claws and the median row of spines below on last joint of mid and hind tarsi. In the smaller species the spines may be reduced to one or two or none, but antennae never thickened toward tip.

The hind tibiae have fairly large spines above, not unlike some Psammocharinae, and a few species have spine-pits near upper tip of hind femora, also suggesting Psammocharinae. However, there is no real pocket in the base of third discoidal cell, and although there is no groove across the second ventral segment there is a transverse depression. The anal in hind wings ends at or near the forking of cubitus.

In the male the claws are simple in hind legs. The type is *Pompilus nobilis* Fabr., and there are numerous species in South America; the smaller, almost bare species I have placed in a new subgenus, *Foximia*. The males have bristly hind tarsi and the subgenital plate is usually long and very slender.

Females

1. Propodeum distinctly hairy above although the hairs may be quite short, front coxae hairy; stigma small, shorter than width of marginal cell ..... *Priochilus* s.s. 2
   Propodeum not hairy above, front coxae not hairy or at most with a few scattered hairs; wings usually banded, stigma longer ..... *Foximia* subgen. 9
2. Fore wings black 3
   Fore wings pale, clouded or banded with dark 7
3. Face, thorax, propodeum, and abdomen with much silvery, propodeum hairy behind 4
   Face silvery, little elsewhere 5
4. Mesosternum projecting laterally in an almost cone-like hump; carina of hind tibia slightly undulate, upper spines very short; mid tibia enlarged and with many short spines, second submarginal cell much longer than high ..... *superbus*
   Mesosternum not projecting cone-like; carina of hind tibia not undulate, some upper spines nearly as long as width of joint; mid tibiae slender, with fewer and longer spines; second submarginal cell only a little longer than high ..... *regius*

5. Second submarginal cell only a little if any longer than high, both ends oblique, propodeum hairy, face somewhat silvery..*rhomboideus*
Second submarginal cell plainly longer than high, ends less oblique..... 6

6. Propodeum with long black hair above; clypeus very hairy all over, margin not polished; second submarginal cell almost twice as long as high, third submarginal very wide at tip; anal in hind wings ends beyond forking of cubitus.....*imperius*
Propodeum with only very short fine hair, hardly noticeable; clypeus with only a few hairs in a row, margin polished, shining; second submarginal cell not one and one-half times as long as high, third submarginal cell not very wide at tip; anal in hind wings ends at forking of cubitus, front coxae with only a few hairs.....*plutonis*

7. Bands on fore wings black and hyaline between them; propodeum black across middle, silvery at base and broadly on posterior half; clypeus notched on side.....*nobilis*
Bands on fore wing more brown, and somewhat yellowish or fumose between; propodeum entirely silvery above..... 8

8. Clypeus notched on each side before the truncate tip as in *nobilis*; basal part only of first abdominal segment silvery; face silvery up to ocelli.....*peruanus*
Clypeus with even sides before truncate tip; almost all of basal segment of abdomen silvery; the silvery of face does not reach to ocelli.....*nubilis*

9. Abdomen rufous to yellowish brown, extreme base black, front coxae with a few scattered hairs, outer dark band on fore wings very broad, inner band extending basally; legs black.....*formosus*
Abdomen black..... 10

10. Mid and hind coxae and femora rufous; front coxae with a few bristles.....*amabilis*
Mid and hind legs wholly black; front coxae not hairy in front 11

11. No golden pile on front..... 12
Front with golden pile, also usually face..... 13

12. Hyaline between bands..... 15
Yellowish between bands; no trace of low teeth on hind tibia; second submarginal cell little narrowed above; no cross-ridges on propodeum.....*scrupulus*

13. Hind tibia above has an inner row of about ten spines, near by is a median carina, broken into about six or eight parts, each part tipped with a short spine; then about five or six spines in an outer row.....*vitulinus*
No median carina on hind tibia above, nor median row of spines (except sometimes one or two near tip)..... 14

14. Propodeum with distinct transverse ridges near the turn; second basal cell fumose; abscissa four not longer than second plus third ..... *sericeifrons*
Propodeum not distinctly striate; second basal cell not fumose; abscissa four longer than second plus third abscissa ..... *aurifrons*

15. No ridges on propodeum; hind tibia above with a carina, plainly broken into low elongate teeth; second submarginal cell much narrowed above ..... *opacifrons*
Very distinct ridges on propodeum; hind tibia not as above; tip of fore wing dark with a snow-white spot beyond third submarginal cell ..... *fraternus*

Males

1. Fore wings banded with black or brown 2
Fore wings nearly wholly black 7

2. Abdomen with white spots or bands; spurs white 3
Abdomen without pale marks, except at tip; spurs dark 5

3. Basal segment of abdomen pale on basal part, also basal bands on segments two and three; pronotum yellowish behind; front tibiae and tarsi pale ..... *scutellatus*
Basal segment black above 4

4. Second submarginal cell as high as long below, narrowed above; clypeus dark, an oval pale spot each side ..... *fragilis*
Second submarginal scarcely narrowed above, more nearly square; clypeus pale, with a minute dark spot in middle; pronotum with band of whitish pubescence behind ..... *clarus*

5. Mid and hind coxae and femora rufous, no silvery on body, propodeum not hairy ..... *amabilis*
Legs black; propodeum more or less hairy 6

6. Third submarginal cell fully two-thirds of its length from wing-margin, not out as far as tip of marginal cell; bands separated by about width of the second band ..... *nobilis*
Third submarginal cell only about one-third its length from wing-margin, as far out as tip of marginal cell; space between bands hardly broader than first band, dark of fore wing extending to tip ..... *nubilis*

7. Mid and hind coxae rufous; no silvery on body ..... *ruficoxalis*
Mid and hind coxae black 8

8. Propodeum silvery on posterior half ..... *regius*
Propodeum not silvery 9

9. Second submarginal cell almost twice as long below as broad; third submarginal cell much longer than second ..... *imperius*

Second submarginal cell but little if any longer than broad, and more than half the length of the third cell.....*rhomboideus*

Pompilus resplendens Fox may belong to this genus.

Priochilus superbus Banks

Described from British Guiana, Colombia, Bolivia, and Peru. Others from Rio Essequibo, B. Guiana, 29 Sept. (W. G. Hassler), Achinamiza, Peru, 28 August (Bassler), and Iquitos, Peru (H. Bassler) in Amer. Mus. Nat. Hist.

Priochilus nubilus spec. nov.

Black, with two broad bands on fore wings. Body with silvery areas much as in *nobilis*, the clypeus, lower face (not reaching ocelli collar and lower sides of the pronotum, and border behind, propodeum entirely above, coxae, most of basal segment of abdomen, bands on bases of second and third segments, and more or less in middle of the segments behind.

The fore wings have the bands much broader than in *nobilis*, of a slightly yellowish brown, and plainly yellowish between the bands, the first band usually extends basally, leaving clearer streaks in some cells, the outer band is very broad, and often the brown extends or suffuses the yellowish area, so that the bands tend to run together. In the hind wings the median mark is also more extended than in *nobilis*.

In general the structure is similar to *nobilis*, except that the clypeus slopes evenly on sides; propodeum with fine white hair above; hind tibia with a median carina above and each side of it a row of six to eight spines, inner spur not one-half of basitarsus.

In the fore wings the second submarginal cell is plainly longer than broad, each end about equally oblique; the third cell longer than in allies, being more than twice as long below as broad at base, its tip not one-third its lower length from margin of wing; second recurrent ends one-third from base; in hind wings the anal vein ends plainly beyond the forking of cubitus.

Length of fore wings 17 mm.

Type from Maracajú, Matto Grosso, Brazil, April-May (Fairchild). Type M. C. Z. no. 26188; also Mera, Ecuador (Williams).

Priochilus rhomboideus Fox (Pompilus)

Bartica district, 5 March; 8, 21, 24 May; 25 Jan.; Arakaka 21 December; Turesi Falls 11 October; Mt. Everard 15 November; Georgetown 10 to 15 November; Demerara River 8, 24 March, all British Guiana (Beebe, Wheeler, Lang); Santarem, February and Rio de Janeiro, November, both Brazil (H. H. Smith ex Carnegie Mus.); Kwakeogren, Saramacoa River, Surinam 8 June (Cornell Univ.); Moengo, Boven, Cottica River, Surinam, 13 to 23 May (Cornell Univ. Exped.); Sint Barbara Plant., Surinam River, Surinam 11 to 14 April (Cornell Univ. Exped.); Paramaribo, Surinam, 7 May (Cornell); Belem, Para, Brazil 15 July (Bequaert); Blairmont, Sept., New Amsterdam, Aug., both Br. Guiana and from Mr. Williams; Jabaty, Para, Brazil, May (Williams); Tena, Ecuador, 1 May, (Williams); Rupunoni River, Brit. Guiana, Sept. (Thurston coll.), Amer. Mus. Nat. Hist.

Priochilus peruanus spec. nov.

Black; clypeus, face up to ocelli, hind margin of pronotum; almost all of propodeum, coxae, pleura, basal part only of first segment of abdomen, basal part of second segment, an elongate spot on each side of third, fourth, and fifth segments, silvery. Fore wings with two broad dark bands, as broad as in *P. nubilus*, and between them the wing is yellowish; beyond the third submarginal cell narrowly whitish and narrowly dark across tip.

Clypeus like that of *P. nobilis*, with a notch each side before truncate tip; third submarginal only a little longer than second, and fully one-half its lower length from wing-margin; in hind wings the anal vein ends about at forking (as in *nobilis*); hind tibia with two rows of short spines above, inner spur not one-half of basitarsus.

Length of fore wings 16 to 18 mm.

From Iquitos San Rogue, Peru, February and March, and Mishyuacu, Peru, 15 August, (Klug coll. ex. Cornell Univ.). Type at Cornell, paratype M. C. Z. no. 26677. Another from Iquitos, Peru (H. Bassler) Amer. Mus. Nat. Hist.

In appearance much like *P. nubilus*, but structure more like *P. nobilis*.

Priochilus regius Fabr. (Pompilus)

From Kartabo, 4 March, 28 April, July-August; Kamakusa, September; Forest Settlement, Rio Mazaruni, August to September;

Kalacoon; Bartica, 8 February, 21 January, 4 March, Penal Settlement, 7 October; Demerara River, 10, 18 March, all British Guiana (Beebe, Wheeler, Lang, Weber, Cornell Univ. Exped.); Restrepo, Dept. Meta, 500 m. Colombia (Bequaert); Tunapuna, Trinidad (Weber); Belem, Para, Brazil, 19 September (Bequaert); Caravalles, Brazil, January (Fairchild); Blairmont, Br. Guiana, Oct. (Williams); Belem, Para, Brazil, June (Williams); Mera, Ecuador, Febr. (Williams). Middle Rio Ucayali, Peru, 26 December; Shudihar Riv., Brit. Guiana, 1 January (Hassler); Rio Santiago, Peru, 7 August (Bassler), in Amer. Mus. Nat. Hist.

Priochilus regius var. infumatus var. nov.

This in general is like the typical form, but in the hind wings there are no hyaline areas, the entire wing to base is dark, just as fore wing.

The form averages a little larger than the typical form. All specimens are from Peru or Ecuador. Ackinamiza, 18 September; Rio Santiago, 7 August, Upper Rio Huallaga, 13 January, Middle Ucayali, 26 December, and Iquitos, all Peru and all taken by Dr. Bassler, Amer. Mus. Nat. Hist.; others from Tena and Mera, Ecuador in February and March (F. X. Williams). Type Amer. Mus. Nat. Hist., paratype M. C. Z. no. 26060.

Priochilus imperius Banks

Types from Kamakusa, Br. Guiana; Guayaquil, Ecuador; Santa Cruz, Bolivia, and Iquitos San Rogue, Peru. Also from Blairmont, Br. Guiana. Sept. Oct., Nov. (Williams); Bucay, Ecuador, 4 Oct. (Williams); Rio Itaya, Peru, Dec. (Cornell); Rio Cairy Uaupes, Amazonas, Brazil, November (H. Schmidt) Amer. Mus. Nat. Hist.; Iquitos, Peru (H. Bassler) Amer. Mus. Nat. Hist.

Priochilus plutonis Banks

A female from Tena, Ecuador, 14 Febr. (Williams); described from British Guiana.

Near *P. imperius* but hair on propodeum fully one-half shorter, front scarcely hairy, less and shorter hair on thorax, none on mid and hind coxae; clypeus with only a transverse row of bristles; hair on venter not so dense; propodeum with distinct groove in middle; abdomen very slender.

Priochilus ruficoxalis Fox (Pompilus)

A male from Tena, Ecuador, 23 Febr. (Williams).

Venation much like *regius*; subgenital plate long and tapering to

a sharp point, with a carina along middle, and clothed with fairly long hair.

Priochilus nobilis Fabr. (Pompilus)

From Kartabo 4 April; Bartica 18 February, 15 April; Tropical Research Laboratory, all British Guiana (Beebe and Wheeler); foothills north of Tunapuna, Trinidad (Weber); Belem, Para, Brazil, 19 September (Bequaert); Maracajú, Matto Grosso, Brazil, April-May, (Fairchild); Santa Cruz, Bolivia (Steinbach) and El Campamiento, Col Perene, Peru, 22 to 24 June (Cornell Univ. Exped.); Belem, Para, Brazil, June (Williams); Blairmont, Br. Guiana, Nov. (Williams).

In certain lights the hyaline of wings, particularly of the male, shows a distinctly bluish iridescence.

Pompilus cosmopteryx Cameron appears to be a synonym, and *P. multifasciatus* Taschenberg is doubtless the same species.

Priochilus (Foximia) amabilis spec. nov.

Body black, without silvery sheen, antennae and front legs black, tarsi brown, mid and hind coxae, trochanters, and femora rufous, tips of latter and the tibiae black, tarsi more brown; fore wings largely brown as in *P. peruanus*, the tip broadly hyaline, a narrow, irregular nearly hyaline band between the two broad dark bands, the subbasal band extends back to base of wing, except in the first basal cell, stigma and veins nearly black; hind wings mostly suffused with yellowish brown, but much of basal portion more hyaline.

Structure generally similar to *P. formosus*; no hair above on propodeum, none on face and front, one or two long hairs each side on vertex near eyes, clypeus with a transverse row of bristles across, no other hairs, a few long hairs on front coxae, few and very small hairs on pronotum. Hind ocelli scarcely nearer each other than to eyes; third antennal joint much longer than vertex-width; propodeum with median groove above; abdomen hairy toward tip, also on venter, except base.

In fore wings venation much like *P. formosus*, the second submarginal cell fully one and one-half times as long as broad, base curved, first recurrent received near apical fourth, third submarginal cell little, if any, longer below than second, above a little shorter, receiving the second recurrent vein (slightly curved) near basal third; basal vein ends plainly a little before transverse; in hind wing anal vein ends before forking of cubitus.

Hind tibia with a low, median carina above, broken into about ten short ridges, none with spine at tip, about ten spines in the row each side of the median carina, inner spur not one-third of basitarsus.

Male much more slender, mid and hind legs colored as in female, the first and most of second segment also rufous or yellowish, front legs (except coxae) dull yellowish, tarsi more brown; hind ocelli nearer to each other than to eyes; body very slender; third antennal joint not equal to vertex-width; venation as in female.

Length of fore wing, female, 15 mm.; male 12.5 mm.

From Mera, Ecuador, 25 January (F. X. Williams). Type, allotype in M. C. Z. no. 26748, paratype returned to Mr. Williams.

Priochilus (Foximia) fragilis Smith (Pompilus)

This appears to agree quite well with the description. The clypeus of male is dark with a pale (not white) spot each side in some views obscured by the white pubescence; the pronotum is not white behind, the propodeum is strongly silvery on sides, and a little more slender; abdomen with the same two white bands; legs black, spurs white, and a white spot at base of mid and hind tibiae; the front tibiae as well as tarsi are pale, inner spur of hind tibia about two-thirds of basitarsus; the subgenital plate is more slender and seen from side is less triangular.

In fore wings the dark spot scarcely invades the second submarginal cell and is very much broader over the second recurrent; the marginal cell is not quite so elongate, the difference being in apical abscissa; third submarginal much as in allies, receiving the second recurrent further out, but the second submarginal is much shorter (in the three specimens seen), being shorter below than broad and narrowed nearly one-half above, so the base and tip are far from parallel.

Three males, two from Rio Frio, Magdalena, Colombia, 20 July (G. Salt), and one from Chapada, Brazil (ex H. H. Smith coll. Carnegie Mus.).

Priochilus (Foximia) fraternus spec. nov.

Closely similar to *P. sericeifrons* in that there are ridges across the apical half of the basal part of propodeum.

Body and legs black, last segment of abdomen yellowish rufous; antennae black, but rufous on under side of part of third and all of fourth, fifth, and sixth joints; clypeus and lower face silvery, also a little each side of scutellum, posterior sides of propodeum strongly

silvery and extending upon sides of posterior slope, but much of this slope remains black; abdomen with second, third, fourth, and fifth segments above somewhat sericeous, especially toward base of segments; fore wings with brown band over basal vein, not extended basally, most of apical third of wing from base of second submarginal cell to tip brown, but a snow-white spot just beyond the third submarginal cell.

The clypeus is shorter than in *sericeifrons*, the face plainly narrowed above, so the vertex is more narrow than in *sericeifrons*, and the ocelli in a more slender triangle, the hind ones nearer to each other than to the eyes; fourth antennal joint nearly equal to vertex-width, the third not so long as in *sericeifrons*. Pronotum behind deeply arcuate; propodeum with the basal part and posterior slope strongly separated by the last or next to last ridge which is very coarse (in *sericeifrons* in a nearly even curve, from side), no hair on propodeum; abdomen moderately slender, a few very fine pale hairs at tip above and below; front coxae (as others) without hairs or bristles; the spines above on mid and hind tibiae are short, and not placed so plainly in rows as in *sericeifrons*, inner spur of hind tibia one-half of basitarsus; no spines under last joint of mid and hind tarsi.

In fore wings venation very similar to *sericeifrons*, in hind wings the anal vein ends much before the forking of cubitus; both submarginals small and the third fully twice its lower length from margin of wing.

Length of fore wing 12 mm.

A female from Tena, Ecuador, 16 March (F. X. Williams). Type M. C. Z. no. 27223.

Priochilus (Foximia) scrupulus Fox (Pompilus)

From Kartabo, British Guiana, July-August (Wheeler); Santarem, Brazil (H. H. Smith ex Carnegie Museum); Province Sara, Bolivia (Steinbach); Belem, Para, Brazil, May (Willims).

Priochilus (Foximia) opacifrons Fox (Salius)

Common in British Guiana from Kartabo, Bartica, and Demarara River, in winter, spring, and summer. Described from island of Jamaica, but these agree with the types, and Fox later recorded it from Brazil; also Caripito, Venezuela, 3 June (Beebe); Jabaty, Para, Brazil, May (Williams); Bucay, 26 March, and Tena, 4 March, both Ecuador and from Mr. Williams.

Priochilus (Foximia) vitulinus D. T. (Pompilus)

From Kamakusa, British Guiana, September (Lang); Tukeit, British Guiana 15 August; recorded by Fox from Chapada, Brazil, and described by Smith as *diversa*, a preoccupied name. *Salius pilifrons* Fox is a related form.

Priochilus (Foximia) sericeifrons Fox (Pompilus)

From Bartica, 28 January and Demerara River, 19 March, both British Guiana; Port of Spain, Trinidad (Thaxter); Lower Rio Negro, Amazonas, Brazil, 23 August (Bequaert); Mera, Ecuador, 1 Febr. (Williams); Tumatumari, Br. Guiana, July (Williams). Cameron's *Pompilus harperi* appears to be the same species.

Priochilus (Foximia) formosus Banks

The type from Kamakusa, Br. Guiana; also from Tena, Ecuador, 4 July (Williams), and Kaieteur, British Guiana, 4 August (Amer. Mus. Nat. Hist), and Col. Perene, Peru 1 July (Cornell Univ.).

Priochilus (Foximia) aurifrons Banks

Described from Venezuela (R. Lichy coll.).

Priochilus (Foximia) clarus Banks

Described from Muzo, Dept. Boyaca, Colombia, 900 m., 20 to 30 June (Bequaert).

Priochilus (Foximia) scutellatus Fox (Pompilus)

Male only known; described from Brazil; one from Muzo, Dept. Boyaca, Colombia, 900 m., July (Bequaert). The marginal cell is not half its length from tip of wing; in hind wings the anal ends at forking of cubitus; basal vein ends at transverse, straight, not oblique; inner spur of hind tibiae more than one-half of basitarsus.

There is a yellow band at tip of propodeum, yellow base to first three abdominal segments, and the last segment yellowish above; front tibiae and tarsi pale, and a pale spot on base of mid and hind tibiae; spurs white or cream; antennae pale beneath.

Clypeus, face, and propodeum silvery. The marginal cell is about two-thirds its length from wing-tip, about as broad as second submarginal cell, the fourth abscissa about one-half of costal length of

cell; second submarginal cell a trifle broader than long, both ends about equally oblique; first recurrent ends just before tip of cell; third submarginal cell one and one-half times as long below as the second, above shorter than second, outer side oblique, but nearly straight, second recurrent (curved in middle) ends before end of basal third, tip of third cell about its length from margin of wing. The subgenital plate is not so slender as in most species. The venation is similar to that of *P. aurifrons*.

Anacyphonyx gen. nov.

The type of Cyphononyx and the various other African species I have seen have the transverse vein (nervellus) about straight across or scarcely oblique; in the South American forms that would go there by claws, venation, etc., the transverse vein is strongly oblique, and in the hind wings the anal ends much beyond the forking of cubitus, in the true Cyphononyx the anal is interstitial or almost so with forking of cubitus. The clypeus is fairly broad, slightly convex or truncate below, the surface with large punctures on lower part; median groove on face very distinct; antennae short, third joint very much shorter than vertex-width; pronotum nearly vertical in front, propodeum transversely striate; legs rather short and with many stout spines. Genotype *A. fidelis* spec. nov.

Synopsis of species

1. Wings black, with a broad yellowish band across near middle. . *brevipennis*
   Wings without any such band 2
2. Wings largely ferrugineus, tip broadly black . . . . . *rosasi*
   Wings largely or wholly black, no ferrugineus 3
3. Tip of fore wings pale; antennae with four or five apical joints rufous . . . . . *apicipennis*
   Tip of fore wing not plainly pale 4
4. Body blue; antennae wholly black . . . . . *fidelis*
   Body black; antennae wholly pale rufous . . . . . *metallica*

Anacyphonyx apicipennis Fox (Salius, Priocnemis)

From Santa Cruz, Bolivia (Steinbach), and Villa Rica, Paraguay, February (Schade coll.) (Cornell Univ. coll.); Campinas, Sao Paulo, Brazil, March (Williams).

The venation is similar to *fidelis*, but the basal vein ends nearer the transverse; the teeth on hind tibiae are blunt; the ridges on posterior slope of propodeum are not at all oblique, and not interrupted in the middle.

Anacyphonyx brevipennis Taschenberg

One female from Villa Rica, Paraguay, January, (Schade coll.) (Cornell Univ.).

This has a close resemblance to *Pepsis completa*. A little hair on head and pronotum, propodeum with only very fine almost invisible hair, tip of abdomen densely haired on two segments.

Clypeus broad, truncate below, coarsely punctate, not so convex transversely as *apicipennis*; antennae very short, third plus fourth joints hardly equal vertex-width; lateral ocelli much nearer each other than to eyes; pronotum very short in middle, angulate behind; propodeum coarsely ridged, tubercles at turn are very prominent, no broad median furrow as in *apicipennis*; hind tibiae above with an inner row of teeth and an outer row of spines whose bases are almost teeth, the bristles longer than teeth or spines, inner spur not one-half of basitarsus, the outer spur curved, that on mid tibia still more strongly curved.

Venation much as in *apicipennis*, the outer side of third submarginal cell less sloping; first recurrent ends at apical fourth of second submarginal, the second recurrent (scarcely curved) ends at middle of third submarginal cell; in hind wings anal vein ends much beyond forking of cubitus.

Anacyphonyx rosasi spec. nov.

Female. Body black, with distinct bluish, purple, or greenish sheen, most prominent on upper parts; legs and antennae black or very dark; wings rufous, but with a broad dark band, in fore wings before the tip, the extreme tip paler; the dark invades the cells, occupying nearly the whole of the marginal cell, veins pale exeept in dark band; in hind wings the dark band reaches to tip, but not as broad as in fore wings.

Clypeus truncate below, hairy on lower portion; face scarcely narrowed above, front on each side with a large flat, raised area, in certain views faintly striate, with some short hairs mostly below and each side by eyes; vertex but little arched; ocelli in a very low triangle,

laterals closer to each other than to eyes, a shallow pit behind each lateral ocellus; antennae short, the third joint nearly one and one-half times as long as fourth; second plus third joint not equal to vertex-width.

Pronotum with some short hair above, deeply, almost angularly excavate behind; propodeum with coarse, sharp ridges, some especially strong near the turn, posterior slope also with similar ridges, fainter toward abdomen, some scattered hairs above; abdomen moderately long, very hairy on last two segments above; last ventral with long hairs all over, other ventral segments with hairs on posterior parts.

Legs moderately short; a few hairs on femora, coxae with bristly hair; hind tibia with a row of rather small teeth above, and a row of short, stout spines, inner spur not one-third of basitarsus, outer spur about as long and curved.

In fore wings the marginal cell is about twice as long as space to tip of wings; second submarginal cell fully twice as long below as broad, base strongly oblique, tip not oblique, receiving the first recurrent vein at base of outer third; third submarginal but little longer above than below but much wider apically than the second, the end-vein strongly bent below middle, receiving the second recurrent (nearly straight) a little before middle, the appendix reaches fully one-half way to margin; in hind wings the anal ends more than one-fourth way beyond forking of cubitus.

Length of fore wing 18 to 20 mm.

From Cordova, Argentine (Davis); Argentine (A. M. N. H.), and Cosquin, Sierra de Cordoba, Argentine, 1 to 9 March (Cornell Univ. Exped.). Type M. C. Z. no. 26623, paratypes there, Amer. Mus. Nat. Hist. and at Cornell Univ.

The description of *Salius hirtellus* Brèthes based on a male is somewhat suggestive of this species, but there are some differences, and nothing is said about ridges on propodeum, nor of the claws, nor of teeth or spines on hind tibia.

Anacyphonyx fidelis spec. nov. (Fig. 25)

Female. Body black; thorax, propodeum, and abdomen above with a bright blue to greenish sheen, antennae and legs black, last joint of antennae paler, wings blackish, quite dark near base, but gradually paler toward tip, the submarginal cells are darker through the middle, a large pale scar in base of first discoidal cell, veins mostly yellowish brown.

Face shining, without hair except a few near eyes above, and no the lower part of clypeus, its lower margin truncate; face slightly wider in middle than on vertex; ocelli large and in a low triangle, laterals not diameter from anterior ocellus, and much nearer to each other than to eyes, back and outward from each lateral ocellus is a depressed area; antennae short, second plus third joint not nearly equal to vertex-width; pronotum deeply angulate behind, with only minute hairs above; a few long hairs on scutellum; propodeum without hair, rather strongly ridged on posterior slope and above, those on anterior part of upper surface do not extend to outer sides, a more or less distinct median groove; mesosternal tubercle more prominent than in other species.

Abdomen slightly flattened, last two segments above with much hair, last ventral segment with apical half covered with long hairs, and a fairly broad area on posterior part of other ventral segments hairy; abdomen finely punctate above, also below in the hairy areas. Legs moderately slender, the spines or bristles mostly short; the hind tibia has an inner row of sharp teeth and an outer row of short spines, and some bristles, inner spur about two-fifths of basitarsus, outer not so long and curved near tip.

In fore wings the marginal cell is plainly less than twice as long as space beyond to wing-tip; the second submarginal cell is more than twice as long below as broad, base very oblique, narrowing the cell above almost a third, end-vein not oblique, receiving the first recurrent at beginning of outer third; the third submarginal hardly longer below than second but somewhat longer above, outer side strongly bent near middle, upper part very oblique, appendix not reaching one-third way to outer margin; in hind wings the anal vein ends plainly beyond forking of cubitus but hardly one-half as far as in *A. rosasi*.

Length of fore wing 20 mm.

One from Nova Teutonia, Santa Catharina, Brazil, 26 May (Plaumann). Type M. C. Z. no. 26624. A paratype from Mafra, St. Catharina, Brazil, 1 April (A. Maller) in Amer. Mus. Nat. Hist. has the last three joints of antennae paler.

Anacyphonyx metallica spec. nov. (Fig. 26)

Male. Black on body, legs, and wings, antennae rufous including basal joints, wings rather strongly iridescent bluish, abdomen with blue sheen above.

Clypeus rather large and long, densely punctate, lower edge truncate, without hair; face very much broadened above, so vertex width is nearly equal to length; ocelli in a low triangle, laterals twice as far from eyes as from each other; antennae rather short, some segments, from side, convex below, last joint much narrowed at tip; vertex-width about one-half length entire antennae; a few hairs on front, moderately long ones on vertex, a little shorter on pronotum above, latter angulate behind; scutellum and post-scutellum hairy above; propodeum only very finely striate, hairy on sides and behind, posterior slope steep.

Abdomen with short hair on basal segment above, longer on sides, venter with much hair on each segment; all femora with a few short hairs, front coxae densely long-haired, other coxae less hairy, hind tibia above with a row of short spines, some at tip of a long low tooth, inner spur about one-half of basitarsus, outer one much shorter.

In fore wings marginal cell much longer than space from tip to tip of wing; second submarginal about twice as long below as broad, base oblique, about one-fourth narrowed above, tip not oblique, receiving the first recurrent before the apical third; third submarginal cell shorter than second below, and slightly above, being much shorter than in other species, outer side oblique and curved, receiving the second recurrent (nearly straight) before middle, appendix reaching more than half-way to margin; in hind wings the anal vein ends about as far beyond forking of cubitus as width of anal cell.

The female is very similar, colors same, but wings not as metallic; tip of abdomen densely hairy; clypeus not so long, truncate below, vertex not so broad so that the lateral ocelli not so far from eyes as in male, but fully one and one-half as far. On hind tibia there is a row of small, rather low but long teeth, and shorter spines. In the fore wing the base of second submarginal is not so oblique and the cell not so much narrowed above.

Length of fore wing 15 mm.

From Villa Rica, Paraguay, December (Cornell Univ.). Paratype M. C. Z. no. 26625.

Anacyphonyx dubiosa spec. nov.

Male. Body black; clypeus and labrum yellow, the clypeus with a dark spot in middle, base of mandibles and lower side of first antennal joint yellowish, also each side on mentum and three joints of maxillary palpi, a broad yellow streak on inner orbits and an elongate spot

behind eyes; an interrupted yellow band on hind border of pronotum, a yellow spot on postscutellum, a yellow band across tip of propodeum extending forward, narrowly in middle and more broadly on sides. Antennae and legs black, front legs with yellow mark on coxae, tip of femora above, most of tibiae and basitarsi yellowish. Wings dark brown, tip of fore wing faintly paler.

The clypeus is about twice as broad as long, almost five-sided, the corners rounded, labrum projecting about one-half length of clypeus; face not narrowed above, from in front vertex slightly evenly convex with curve of eyes, a faint transverse impression behind the ocelli and before crest of vertex; ocelli in a broad triangle, hind ones almost as near eyes as to each other; front minutely, transversely striate, well covered with erect black hair, and scarcely longer on vertex; antennae evenly thick, almost as long as front legs.

Pronotum short, strongly angulate behind, as hairy as head; postscutellum with erect hair. The propodeum viewed obliquely from above appears constricted just behind the spiracles, the area each side behind being evenly swollen, from side-view, however, the basal part is straight and twice as long as posterior slope, which is not at all concave, the entire surface closely and minutely striate; upper surface with little hair, but more on sides; spiracles scarcely their length from base of propodeum.

Abdomen slender, sides nearly parallel, basal part of first segment hairy above; the lateral apical margin of fourth and fifth ventral segments with a dense rather broad, but not high tuft of black hair, the rest of venter devoid of hair; the subgenital plate flat, nearly square, with a little long hair on each side.

The mesosternal tubercle is distinct, but hardly projecting. The legs are fairly slender, only minute hairs on hind tibae, inner spur more than one-half of basitarsus, front coxae with a few long hairs; claws strongly bent.

In fore wings the venation is very similar to both *apicipennis* and *fidelis*, but the second and third submarginal cells shorter in proportion to width.

Length of fore wings 15 mm.

One male from Corupa (Hansa Humboldt), St. Catharina, Brazil, August (A. Maller coll.) Amer. Mus. Nat. Hist. through Frank Johnson. The marks on head similar to many species of Notocyphus, the tufts near tip of abdomen remind one of Pepsis. It may be the male of *fidelis*, but pale tip of fore wing more like *apicipennis*.

PLATE 1

PLATE 1

Fig. 1. Pepsis optimatis, subgenital plate.
Fig. 2. Pepsis amalthea, tip of hind tarsus, and claw enlarged.
Fig. 3. Pepsis cleanthes, tip of hind tarsus.
Fig. 4. Pepsis sumptuosa, subgenital plate.
Fig. 5. Pepsis speciosissima, subgenital plate.
Fig. 6. Pepsis aurozonata, subgenital plate.
Fig. 7. Pepsis petiti, genitalia, from above.
Fig. 8. Pepsis atrata, subgenital plate, and below from side.
Fig. 9. Pepsis vinipennis, third submarginal cell.
Fig. 10. Pepsis euterpe, subgenital plate, normal.
Fig. 11. Pepsis euterpe, subgenital plate, variation.
Fig. 12. Pepsis euterpe, male, hairs on fourth ventral.
Fig. 13. Pepsis pretiosa, subgenital plate.
Fig. 14. Pepsis egregria, subgenital plate.
Fig. 15. Pepsis tolteca, subgenital plate.
Fig. 16. Pepsis petiti, subgenital plate from side.
Fig. 17. Pepsis defecta, subgenital plate.

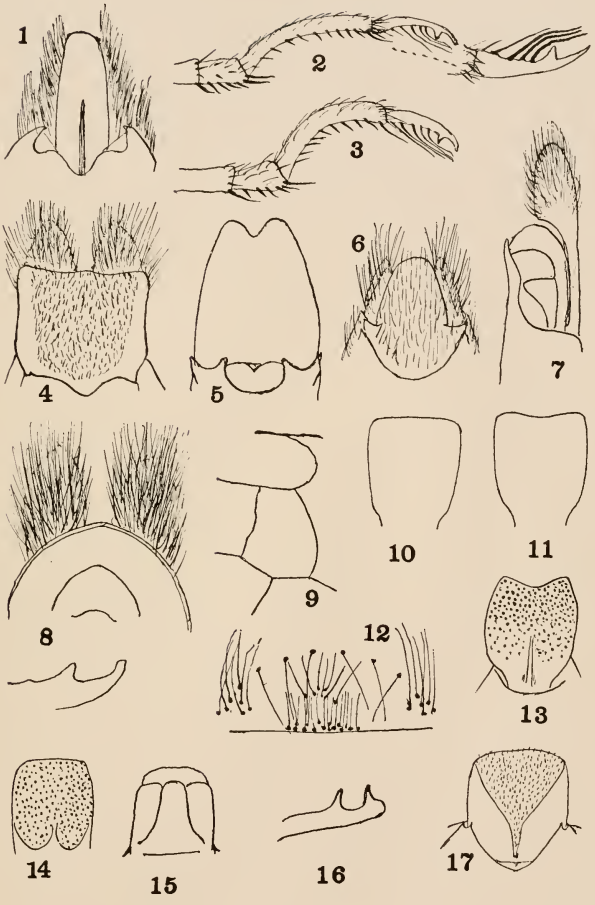
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PLATE 2

PLATE 2

Fig. 18. Phanochilus nobilitatus, genital plates.
Fig. 19. Phanochilus gloriosus, genital plates.
Fig. 20. Phanochilus ornatus, genital plates.
Fig. 21. Phanochilus ornatus, subgenital plate.
Fig. 22. Phanochilus fuscomarginatus, subgenital plate.
Fig. 23. Phanochilus gloriosus, subgenital plate.
Fig. 24. Phanochilus nobilitatus, subgenital plate.
Fig. 25. Anacyphonyx fidelis, clypeus, and hind claw.
Fig. 26. Anacyphonyx metallica, front claw.
Fig. 27. Phanochilus fuscomarginatus, genital plates.
Fig. 28. Lissagenia insignis, clypeus, male.
Fig. 29. above, Priophanes, hind tibia.
below, Ameragenia, hind tibia.
Fig. 30. Priophanes faceta, fore wing of genotype.
Fig. 31. Priocnemella eurytheme, clypeus of male.
Fig. 32. Pulvillus of Calicurgus pretiosa and C. machetes.
Fig. 33. Pulvillus of Calicurgus quitus and C. huitaca.
Fig. 34. Pulvillus of Calicurgus marginatus and C. jocaste.
Fig. 35. Pulvillus of Calicurgus nubilus, C. orejones, andicolus, rufigaster, loranthe, australis, and fratellus.
Fig. 36. Marginal and submarginal cells of Abripepsis inca.

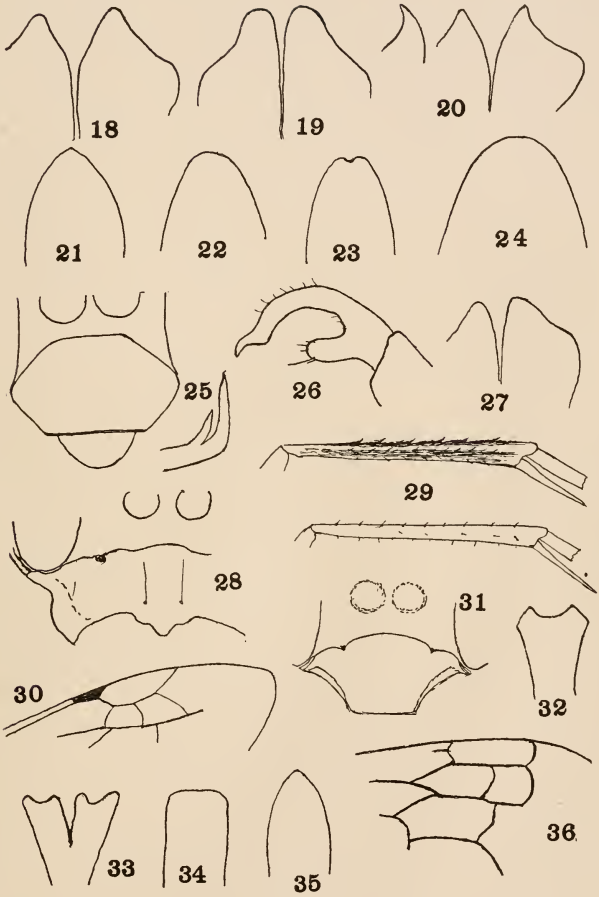
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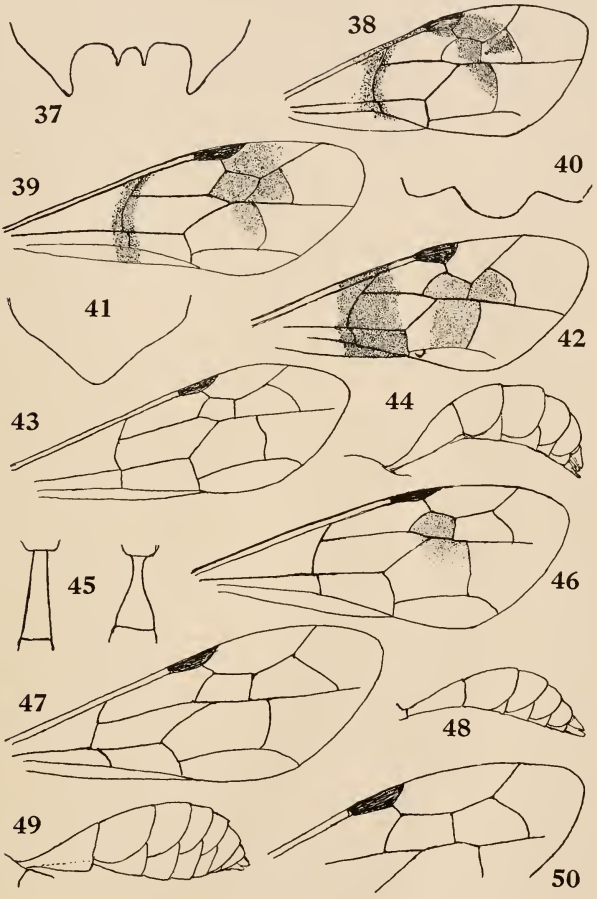
PLATE 3

PLATE 3

Fig. 37. Ameragenia volatilis, clypeus of male.
Fig. 38. Dipogon ariel, fore wing.
Fig. 39. Dipogon neotropica, fore wing.
Fig. 40. Pseudagenia smithi, clypeus of male.
Fig. 41. Pseudagenia femorata, clypeus of male.
Fig. 42. Dipogon alastor, fore wing.
Fig. 43. Ageniella amoena, fore wing.
Fig. 44. Priophanes, abdomen of male.
Fig. 45. at left, first segment of abdomen of Priochilus; at right, of Pseudagenia.
Fig. 46. Ameragenia festina, fore wing.
Fig. 47. Pseudagenia tarsata, fore wing.
Fig. 48. Calicurgus, abdomen of male.
Fig. 49. Pseudagenia tarsata, abdomen of male.
Fig. 50. Pseudagenia comparata, fore wing.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